The
evention & Cure
of
Tuberculosis

The Prevention and Cure OF Tuberculosis

A COLLECTION
OF ARTICLES OF A POPULAR CHARACTER ON
THE SUBJECT OF TUBERCULOSIS
BY

S. A. KNOPF, M. D.
J. H. HUDDLESTON, M. D.
DAY ALLEN WILLEY
HENRY P. LOOMIS, M. D.
HENRY B. DUNHAM, M. D.
ROBERT W. CRAIG, M. D.
WILLIAM N. BEGGS, M. D.
GEORGE E. ABBOTT, M. D.
GUY HINSDALE, M. D.
CHASE P. AMBLER, M. D.
JOSEPH EICHBERG, M. D.
AND OTHERS

COMPILED BY
JOSEPH R. LONG

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PREFACE

It has been well suggested that, as a rule, it is neither wise nor necessary for persons not professionally concerned to think much about disease, or to consider how it may be acquired, prevented or cured. These are matters which we properly leave to the physician. But this is not the case with tuberculosis. The appalling prevalence of this disease, and the peculiarity of the methods which must be employed to combat it, make it the duty of every properly disposed person, whether sick or well, to inform himself about it. The instruction of the people at large regarding tuberculosis is one of the most important factors of the great campaign now being conducted with such success against this great enemy of mankind. It is hoped that this book, which has been compiled to supply a need which the compiler has personally felt and observed, may be of some service in this work, and may afford to persons threatened or affected with tuberculosis needed information and encouragement.

The articles herein published have been selected with special reference to the needs of non-professional readers. Some of them were written specially for the general public, others were prepared for physicians, but all may be read with profit by either physician or layman. They are in the highest degree authoritative and may be relied upon as expressing the latest development of professional knowledge and opinion on this important subject.

The compiler take pleasure in acknowledging the courtesy of the authors and publishers of the articles herein republished in permitting their use in this book, and for this, and for their kind words of encouragement, he expresses his thanks.

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TUBERCULOSIS
AS A DISEASE OF THE MASSES, AND HOW TO COMBAT IT

Motto

To combat consumption as a disease of the masses successfully requires the combined action of a wise government, well trained physicians, and an intelligent people

PRIZE ESSAY

BY

S. A. KNOPF, M. D.
NEW YORK

The "International Congress to Combat Tuberculosis as a Disease of the Masses," which convened at Berlin, May 24th to 27th, 1899, awarded the International Prize to this work through its Committee on July 31st, 1900

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The American edition is translated by the author and published by M. Firestack, 110 West Ninety-sixth street, New York.

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The English edition is adapted for the use in England by Dr. J. M. Barbour and published by Rebman, Limited, 129 Shaftesbury avenue, London.

The French edition is translated by Dr. G. Sersiron, and published at Paris by C. Naud, 3 Rue Racine.

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The Hebrew edition is translated by Dr. L. W. Zwisohn, and published by E. Zenser, 158 East Broadway, New York.

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The Icelandic edition is translated by Dr. G. Bjornsson, and published by the Danish Government at Reykjavik.

The Italian edition is translated by Prof. Dr. Roberto Massalongo, of Verona, and published at Milan by Francesco Valardi.

Another Italian edition is translated by Dr. Giovanni Galli, and published by the Societa Editrice Dante Alighieri, at Rome.

The Mexican edition is translated by Dr. D. Vergara Lope, and published by Eduardo Murguia, Mexico.

The Polish edition is translated by Dr. Stanislaus Lagowsky, and published by E. Wende i S-ka, Warsaw.

The Russian edition is translated and published under the auspices of the Tuberculosis Commission of the Pirogoff Society of Russian Physicians at Moscow.

The Spanish edition is translated and published by Dr. Ernesto Sanchez y Rosal, of Berlin, N. W., Luneberger St. 3.

IN PREPARATION.

The Portugese edition is being translated by Prof. D. A. de Lancastre, physician to her majesty the queen, Lisbon.

The Canadian edition is to be published under the auspices of the Canadian Association for the Prevention of Tuberculosis, Ottawa.

The Japanese edition is translated by Dr. Goro Shibayama, Tokio.

The Serbian edition is translated by Dr. V. Vojislav Mihailovic, Graz.

The International Prize Essay of Dr. S. A. Knopf can be procured retail at twenty-five cents, in quantities at fifteen cents, from M. Firestack, 110 West Ninety-sixth street, New York.

PREFACE TO THE GERMAN EDITION.

(By Geh. Med.-Rath Professor B. Frankel, of Berlin, Germany, setting forth the conditions under which the prize was awarded.)

At the meeting of the "International Congress for the Study of the Best Way to Combat Tuberculosis as a Disease of the Masses," which convened at Berlin, May 24-27, 1899, the sum of 4,000 marks was donated by two Berlin merchants, lay members of the Congress, as a prize to be offered for the best essay on the subject "Tuberculosis as a Disease of the Masses and How to Combat It" ("Die Tuberkulose als Volkskrankheit und deren Bekampfung").

The Congress decided on the following regulations concerning this prize:

1. The best popular essay on the subject "Tuberculosis as a Disease of the Masses and How to Combat It," comprising not more than eighty, and not less than forty-eight printed pages, shall receive the prize of 4,000 marks. In case the jury of the prize committee should decide that two essays deserve the prize, the best may receive 3,000 marks, and the second best 1,000 marks. Or, should the decision of the judges find two essays of equal value each shall receive 2,000 marks.
2. The following gentlemen have consented to act as judges: Geheimrath Prof. Dr. B. Frankel; Geheimrath Prof. Dr. Gerhardt; Kapitan z. S. Harms; Wirkl Geh. Ober Reg.-Rath Prasident Kohler; Generalarzt Prof. Dr. von Leut-

hold, Excellenz; Geheimrath Prof. Dr. von Leyden; Freiherr Dr. Lucius von Ballhausen, Excellenz; Geheimrath Dr. Naumann; Oberstabsarzt Dr. Pannwitz; Dr. Graf von Posadowsky-Wehner, Excellenz; Se. Durchlaucht der Herzog von Ratibor.

3. All essays must be sent by December 1, 1899, to Privy-Councillor Prof. Dr. B. Frankel, 4 Bellevue Strasse, Berlin, and each essay must bear a motto, selected by the writer, who shall insert his name within a sealed envelope having the motto on the cover.
4. The essay, or essays (see section 1), to which has been awarded the prize, becomes the property of the "German Central Committee for the Erection of Sanatoria." The latter will take upon itself the printing of the essay and the least expensive method of distribution.
5. The decision of the judges is to be announced through the public press.

The foregoing regulations were published in the medical and lay papers, and as a result eighty-one essays were received by December 1st. The essays were distributed among the judges, with the request to select from them such as were deserving of closer examination. The judges recommended twenty-six for that purpose.

The fifty-five rejected essays were once more examined by the undersigned and his assistants, Drs. Edmund Meyer, Alexander, Finder, Claus, and Elwert, but neither could these gentlemen recommend any of the fifty-five essays for further consideration.

At the meeting of the jury on February 25, 1900, under the presidency of his Serene Highness the Duke of Ratibor, it was decided that the twenty-six selected essays should be once more carefully examined by Drs. Frankel, Gerhardt, Harms,

Kohler, von Leuthold, von Leyden, Freiherr von Lucius and Pannwitz, and the result was that three were ultimately selected for closer choice.

At the next meeting of the judges, on June 15th, it was decided to form a sub-committee composed of Drs. Frankel, Gerhardt, Harms, Kohler, and Pannwitz, to decide upon final action. After careful consideration this committee came to the conclusion that the work bearing the motto,

> "To combat consumption successfully requires the combined action of a wise government, well-trained physicians, and an intelligent people,"

so much surpassed all the others in excellence, that it should be awarded the Congress prize. It was then found that Dr. S. A. Knopf, of New York, was the author of this work.

A few changes, as recommended by the judges, were accepted by Dr. Knopf, and have been incorporated in the present work.

At a subsequent meeting of the German Central Committee it was resolved to publish this essay and arrange for its widest distribution.

PROFESSOR B. FRANKEL.

Berlin, October 1, 1900.

PREFACE TO THE AMERICAN EDITION.

In presenting to the English-speaking world, and particularly to the people of the United States, a translation of the essay, originally written in German, the author desires to state that, while having endeavored to make as exact a translation as possible, he found it necessary to change several passages, making some additions and omissions. His reasons for having done so will be obvious to all who have studied pulmonary tuberculosis or consumption, not only in its medical, but also in its sociological aspects, and who will bear in mind the fact that the habits of nations differ, and that in a popular essay it is absolutely necessary to take these differences into account. Thus it was even necessary, before the original German essay could appear in print, that the author should consent to make certain changes bearing on the particular local conditions and situation of the consumptive poor in Germany. These changes were suggested in detail by the judges who awarded the prize. With a generosity which can not be lauded too highly, these gentlemen did not expect to find in the essays, submitted to them for competition from all over the world, a complete knowledge of the sanitary laws and regulations which are now in vogue in the German empire, nor did they expect the essayists to be familiar with local conditions to the extent of knowing all that would or would not be practicable in the carrying out of suggestions to prevent the spread or the development of tuberculous diseases.

The social conditions in Germany differ very much from those in the United States, and the author felt it his duty to

speak in this American edition of all the important points bearing directly on the question of tuberculosis as a "social disease" in America. The evils of alcoholism, of the overcrowding of tenement houses and of unsanitary dwellings of the poor in general, also some of the causes of malnutrition or underfeeding of the laboring classes, are treated as fully as the nature of such an essay permits.

As an example of the necessity of making certain changes in this work, intended for an American public, I may be permitted to state the following: in Germany every laboring man and woman must be insured against old age, accident, and disease, including tuberculosis, and the employer is held responsible for the compliance with this law. No such law exists in the United States, where even private insurance companies will not insure a tuberculous invalid. As another illustration of the vastly different conditions here and in Germany regarding our subject, we must consider that every one of the forty-seven states of the Union has its own sanitary laws and regulations. They differ widely in rigor and completeness in regard to the prevention of tuberculosis in man as well as in beast. In Germany there is one homogeneous law for all the states and provinces; there is a ministry for "Medicinal Angelegenheiten" (medical affairs), with a cabinet officer at the head, who has for his advisers the highest medical authorities connected with the "Reichs-Gesundheitsamt" (imperial office of health). I hope the time is not far distant when our own beloved country will have similar institutions; when all the state, county, and city boards of health will look to Washington, the seat of the future secretary of public health, as their supreme head and guide in medical and sanitary matters. In the meantime let us labor as best we can; let each state, county and city board of health do its best toward an intelli-

gent, rigorous, and yet not too oppressive public prophylaxis of bovine and human tuberculosis; and let the people at large lend a willing hand in this combat against our common foe; the "Great White Plague."

S. A. KNOPF, M. D.

16 West Ninety-fifth street,
New York, January, 1901.

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TUBERCULOSIS AS A DISEASE OF THE MASSES AND HOW TO COMBAT IT.

INTRODUCTION.

Tuberculosis has been called a disease of the masses on account of its great prevalence among all classes of people. It has been known for hundreds of years as the most feared, most prevalent, and, alas! also as the most fatal of all diseases. Hippocrates, the most celebrated physician of antiquity (460 to 377 B. C.), and the true father of scientific medicine, described pulmonary tuberculosis or consumption as the disease which is "the most difficult to treat, and which proves fatal to the greatest number." Isocrates, also a Greek physician, who lived about the fifth century before Christ, was the first to write of tuberculosis as a disease transmissible through contagion. In the middle ages (1550) the celebrated physician, Montano, declared consumption to be one of the most dangerously contagious and most easily contracted of diseases. An equally strong advocate of the theory of contagion was the celebrated anatomist Morgagni (1682-1771), who never performed an autopsy on an individual who had died from tuberculosis. Toward the end of the eighteenth century the sanitary authorities of some cities of Italy and France considered consumption a highly infectious and contagious disease, and a French medical author of the name of Janett de Langrois reports that the municipal authorities of Nancy had caused the furniture and bedding of a woman who had died from consumption, to be destroyed by fire. The contagion in this case had actually been demonstrated, inquiries revealing

that the deceased woman had slept frequently with a consumptive girl friend until she finally succumbed to the same disease.

In Naples a royal decree, dated September 20, 1782, ordered the isolation of consumptives and the disinfection of their apartments, personal effects, furniture, books, etc., by means of vinegar, brandy, or lemon juice, sea-water, or fumigation. Any violation of this law was punished, if the individual was an ordinary mortal, with three years in the galleys, and if he happened to be a nobleman he was sent for the same time to the fortress and had to pay 300 ducats. The physician who failed to notify the authorities of the existence of a tuberculous patient was fined 300 ducats for the first offence, and a repetition of the neglect would banish him from the country for ten years. According to Portal (1742-1832), there was a law in Spain and Portugal which obliged the parents or nearest relative of a consumptive to notify the authorities when the patient had arrived at the last period of the disease. This was done for the purpose of making sure of the disinfection of the personal effects of the patient after his death.

In the first half of the nineteenth century little attention was paid to the infectious theory of tuberculosis even by medical men. The contagiousness or communicability of the disease could not be scientifically demonstrated, and although there were physicians here and there who believed in the infectiousness of the disease, nothing positive was taught in regard to it at the centres of medical learning.

At last, in 1865, the French physician Villamin demonstrated beyond a shadow of doubt that tuberculosis could be transmitted from one individual to another. He inoculated animals with tuberculous substances, and reproduced tuberculosis not only in the lungs, but also in other portions of the body. Since this discovery and its verification by numerous *experimenters*, such as Cohnheim, Welch, Prudden, Straus,

and others, it has been generally acknowledged that tuberculosis is an infectious disease, and that for its production a specific germ is essential. The discovery of this specific organism (bacillus tuberculosis) was reserved to the great German scientist, Robert Koch (1882).

Consumption is an endemic disease, that is to say, habitually prevalent, and it exists in all civilized countries. Wild tribes and less civilized people succumb to the disease, as a rule, very rapidly as soon as they come in contact with civilization. The proof of this we might find among the North American Indians and among the negroes and their descendants now living in the United States. According to the recent report of the Board of Health of Toronto (Canada), pulmonary tuberculosis is dangerously prevalent among the Blood Indians of the Dominion of Canada. Of every hundred deaths which occurred among the tribes in the year 1898, twenty-three were due to consumption. Since these Indians are kept on a reservation under the supervision of the Canadian Government, these statistics should be considered reliable.

The mortality from tuberculosis among the colored population of the United States is nearly twice that of the white population. However, let us state right here that the cause of this increased mortality among Indians and negroes is to be ascribed not to the blessings of civilization, but rather to the vices, such as alcoholism and excesses of all kinds, which, alas! too often accompany civilizing agents.

There have been so many statistics published concerning the general mortality from tuberculosis in the United States and Europe, that we do not think it necessary to reproduce in detail any of the published tables, but will content ourselves with some general statements. It is now universally admitted that tuberculosis is the most frequent cause of death. According to some statistics every seventh, according to others every

sixth, death is due to tuberculosis in one form or other. According to Dr. George F. Keene, of Rhode Island, who is a very close observer, the annual tribute of the United States to this scourge is over 100,000 of its inhabitants. Each year the world yields up 1,095,000, each day 3,000, each minute 2, of its people as a sacrifice to this plague.

Tuberculosis occurs most frequently in its pulmonary form, commonly known as consumption. According to the Imperial Sanitary Office of Berlin, thirteen per cent. of the deaths (during the years from 1888 to 1892) were due to pulmonary consumption. However, it must be stated that of late the mortality from tuberculosis has decreased in some European and American cities (Berlin, London, New York, Philadelphia, etc.), thanks to better preventive measures and more rational methods of treatment. In one of the succeeding chapters we shall speak more in detail of public prophylaxis and special institutions for consumptives in the combat against tuberculosis. In relation to statistics we desire, lastly, to mention only some interesting facts gleaned from a pamphlet published last year by the Imperial Health Office of Berlin. According to this latest report the mortality from tuberculosis is greatest in Russia and Austria, being more than 3,500 per million inhabitants. It is lowest in England, being less than 1,500 per million. Germany occupies about the middle, while France comes immediately after Austria.*

The researches of recent years have demonstrated that consumption and also many other forms of tuberculosis may not only be prevented, but can in many cases be arrested and lastingly cured. The governments and the medical profession are aware of this, and have laboriously, energetically, and most unselfishly worked in the direction of solving this important

*The United States are not included in this table, but would probably come close to Germany.

problem, which means so much to the welfare of the people. The Congresses for the Study of Tuberculosis, which have met biennially since 1888 in Paris; the International Congress, which convened at Berlin in May, 1899, under the protection of her Majesty the Empress of Germany, and the Italian Congress, which was called together for the same purpose last year in Naples, give the best proof of the zeal of the medical profession and the governments to combat tuberculosis with all possible means.

But, as the motto of this essay expresses it, the intelligent co-operation of the people in this work is indispensable. To enable all men and women to participate intelligently in this combat against a common foe is the purpose of this essay.

We shall now give a brief description of the form of tuberculosis known as tuberculosis of the lungs, pulmonary tuberculosis, or consumption.

CHAPTER I.

WHAT IS CONSUMPTION?

Pulmonary consumption, or tuberculosis of the lungs, is a chronic disease caused by the presence of the tubercle bacillus, or germ of consumption, in the lungs. The disease is locally characterized by countless tubercles; that is to say, small rounded bodies, visible to the naked eye. The bacilli can be found by the million in the affected organ. It is this little parasite, fungus, or mushroom, belonging to the lowest scale of vegetable life, which must be considered as the specific cause of all tuberculous diseases. This parasite not only gradually destroys the lung substance through ulcerative processes, but gives off at the same time certain poisonous substances called toxins which give rise to various, and often serious, symptoms.

The important symptoms of pulmonary tuberculosis are cough, expectoration (spitting phlegm), fever (increased temperature of the body, especially in the evening hours), difficulty in breathing, pains in the chest, night-sweats, loss of appetite, hemorrhages (spitting of blood), and emaciation (loss of flesh).

In the matter expectorated, it is often possible to find the tubercle bacillus with the aid of the microscope and certain coloring matters. It appears in the form of small, slender rods. To give an idea of the minute size of these bacilli or bacteria, we reproduce here what is called a microscopic field *twelve hun*dred times enlarged; in other words, just what one

sees after having prepared a small portion of expectorated tuberculous matter under the microscope. The rods represent

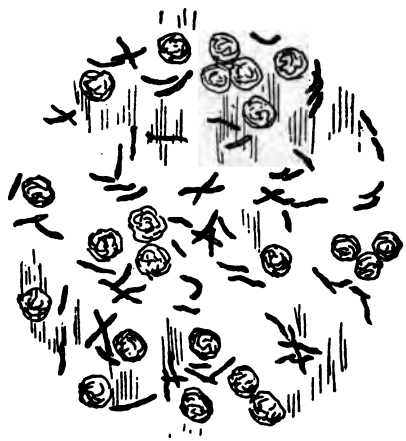

FIG. 1.—Tubercle Bacilli in Expectorated Matter 1,200 times enlarged.

the bacilli; the round or irregular bodies represent other substances which have been ejected along with the bacilli (Fig. 1).

CHAPTER II.

HOW MAY THE GERMS OF CONSUMPTION (BACILLUS TUBERCULOSIS) ENTER THE HUMAN SYSTEM?

1. By being inhaled; that is, breathed into the lungs.

2. By being ingested; that is, eaten with tuberculous food.

3. By inoculation; that is, the penetration of tuberculous substance through a wound in the skin.

Of these three ways in which the bacilli may enter, the first one seems to be the most important.

CHAPTER III.

HOW DOES THE INHALATION OF THE BACILLI TAKE PLACE?

A consumptive individual, even at a period when he is not confined to his bed, may expectorate enormous quantities of bacilli. Now if this expectoration, or spittle, is carelessly deposited here and there, so that it has an opportunity to dry and become pulverized, the least draught or motion in the air may cause it to mingle with the dust, and the individual breathing this dust-laden atmosphere is certainly exposed to the dangers of becoming tuberculous, if the system offers a favorable soil for the growth of the bacilli. By "favorable soil for the growth of the bacilli" must be understood any condition in which the body is temporarily or permanently enfeebled. Such a condition may be inherited from parents, or acquired through alcoholism or drunkenness or other intemperate habits, through privation or disease.

Besides the danger arising from carelessly deposited sputum, or spittle, the inhalation or ingestion of the small particles of saliva which may be expelled by the consumptive during his so-called dry cough, or when speaking quickly or loudly, or when sneezing, must also be considered as dangerous for those who come in close contact with the invalid. These almost invisible drops of saliva may contain tubercle bacilli. Recent experiments in this direction have shown the possibility of infection by this means.

CHAPTER IV.

WHAT MUST BE DONE TO CHECK THE SPREAD OF CONSUMPTION CAUSED BY THE EXPECTORATION OF PULMONARY INVALIDS?

A. *Destruction of Tuberculous Expectoration.*—Consumptives and those living with them must know that all *pre*cautionary measures are instituted in the interest of the

invalid as well as of his fellow-men. These measures protect the patient from reinfection and others from the danger of contracting the disease.

A patient suffering from pulmonary consumption should know that, no matter in what stage of the disease he may be, his expectoration or spittle may spread the germ of the disease if the matter expectorated is not destroyed before it has a chance to dry and become pulverized. The patient should, therefore, always spit in some receptacle intended for the purpose. It is best to have this vessel made of metal so as not to break. It should be half filled with water or some disinfecting fluid, the main thing being to make it impossible for the expectoration to dry.

In factories, stores, railroad cars, waiting-rooms, court-rooms, restaurants, saloons, meeting-places, theatres, menageries—in short, wherever many people congregate—there should be a sufficient number of cuspidors well kept and regularly cleaned. They should be made of unbreakable material and have wide openings. If such measures are carried out, there will be no excuse for any one to expectorate on the floor and thus endanger the lives of his fellow-men.

In the sick-room of a private home, at hospitals or sanatoria, only covered cuspidors should be used, and it is better to have them placed on stands, in niches, or in elevated boxes. We give an example of the last-named kind in Fig. 2, showing a blue enamelled iron spittoon in a box elevated on a stand. The spittoon is fastened by a clamp to the door of the box, and can be easily removed for cleaning. The stand is most convenient when about three feet in height. Such an arrangement, besides making it more sure that the sputum will all reach the inside of the spittoon, has the additional pleasant feature of making the cuspidor visible only while it is being used by the patient. The cover of the receptacle

prevents flies and other insects from coming in contact with the sputum. It has been proved that insects, especially flies, often carry the bacillus out of the sick-rooms of consumptives when sufficient care is not taken to cover the expecto-

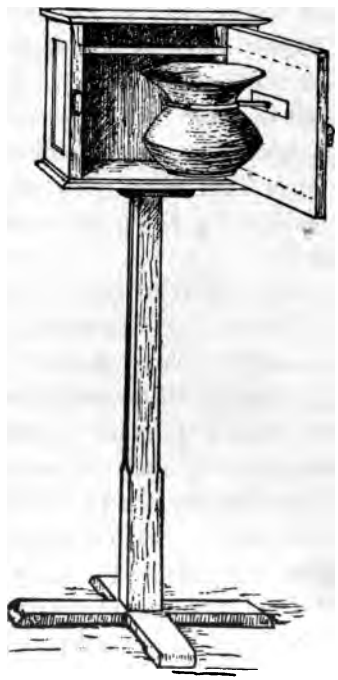

FIG. 2.—Elevated Spittoon.

ration. The fly which has come in contact with tuberculous matter may spread the disease in three ways. First, it may carry small particles of spittle on its feet, and leave them wherever it may alight. Secondly, if it has partaken of tuberculous matter, it deposits its excrement at the next opportunity on some article of food, and thus the bacilli find their way into the digestive organs of man or beast. Thirdly, these

insects may dry and crumble to dust which contains the bacilli, and the germ of the disease may thus enter the lungs.

The cuspidor of metal elevated and covered presents further advantages over the usual uncovered vessel of porcelain or earthenware. Animals, such as dogs, cats, etc., will not be able to reach the contents of the cuspidor; and there is less danger of its bursting when placed outdoors at freezing temperature if enclosed in a box.

For factories, workshops, etc., Predohl's enamelled iron spittoon, nine inches high, eight inches in its largest and three

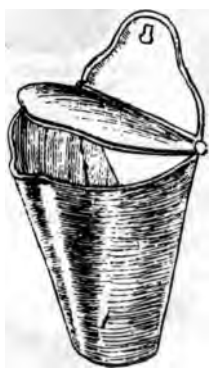

FIG. 3. — Predohl's Spittoon.

FIG. 4.—Dettweiler's Pocket Flask.

inches in its smallest diameter, seems to answer all practical purposes. As the accompanying drawing (Fig. 3) indicates, it can be suspended at any height, and is very easily cleaned and disinfected.

When outdoors, the patient should use a pocket flask to receive the spittle. There are numerous flasks in the market,

and I reproduce a few of them: Dettweiler's, of blue glass and in three pieces (Fig. 4); Knopf's, made of aluminum

FIG. 5 *a*.—Knopf's Aluminum Flask (Closed).

FIG. 5 *b*.—Funnel and Cover to Fig. 5 *a*.

FIG. 6.—Knopf's Aluminum Flask with Plain Cover.

(Figs. 5 and 6); Liebe's, of blue glass in two pieces (Fig. 7). The directions for use usually accompany each flask. The more expensive ones (Figs. 4 and 5) can be manipulated with

FIG. 7.—Liebe's Pocket Spittoon.

one hand. The cleaning of all of them is easy. The expectoration received in any receptacles, large spittoons or pocket flasks, should be so disposed of that the bacilli are killed.

Where there is a good sewerage system the contents of these cuspidors may, without danger, be poured into the water closet. Where there are no running water and perfect sewerage, it is better to boil the contents of the spittoons before pouring them into the water closet, or disposing of them otherwise. Thus, whenever possible, the tuberculous expectoration, that is to say, the entire contents of all classes of cuspidors, should be placed in a pot kept for that purpose which is partially filled with water. Every twenty-four hours or so this pot should be put on the fire and the contents brought

FIG. 8.—Spit-Cup of Aluminum or Porcelain.

to a boil. To raise the boiling point it might be well to add to each quart of water one or two teaspoonfuls of washing soda. After the mixture has boiled for about five minutes, it can be considered totally harmless, for all the bacilli will have been killed. The disinfection of tuberculous expectoration by carbolic acid (5 per cent.) or mercurial solutions (1:2,000) is not so certain, since these substances cause the albumen in the expectoration to coagulate, and thus form, in a measure, a protective cover for the bacilli and make their total destruction more difficult. Ordinary commercial wood

vinegar is a better and more convenient disinfectant and need not be diluted when used.

When people are so situated as not to be able to dispose of the contents of the pocket spittoon by boiling or disinfec-

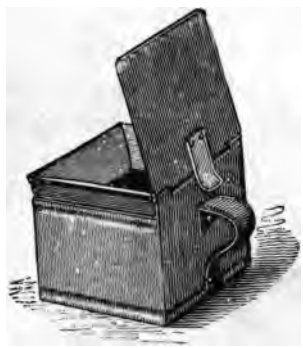

FIG. 9 *a*.—Frame of Seabury & Johnson's Spitting-Cup.

FIG. 9 *b*.—Folded Cardboard, to be Burned After Use.

tion, we would recommend the following method: pour the contents of the flask onto several layers of newspaper, gathering up the edges and being careful not to spill any, and throw the whole at once into the fire.

FIG. 10.—Kny-Scheerer's Sanitary Spittoon Cup.

A handkerchief should never be used as a receptacle for sputum. Patients who are too sick to make use of light porcelain or aluminum cups (Fig. 8), Seabury & Johnson's spitting cup of pasteboard (Fig. 9), or the Kny-Scheerer pressed paper

cup (Fig. 10) should have a number of moist rags within easy reach. Care should be taken that the rags always remain moist, and that the used ones are burned before they have a chance to dry. The paper spit cups with their contents should, of course, also be destroyed by fire.

There will always be some consumptives who can not be persuaded to use the pocket flask, for the simple reason that they do not wish to draw attention to their malady. The only thing for these people to do is to use squares of soft muslin, cheese-cloth, cheap handkerchiefs, or Japanese paper handkerchiefs specially manufactured for that purpose, which can be burned after use. They should also place in their pockets a removable lining of rubber or other impermeable substance which can be thoroughly cleaned. This additional pocket could be fastened to the inside of the ordinary pocket by clamps, and would thus be of no inconvenience to the patient. A pouch of vulcanized rubber or an Oriental tobacco pouch may be used in place of the extra pocket of impermeable material. In any case it is well to have more than one of these pockets or pouches, so that the patient is never without one while they are being cleaned and immersed in some disinfectant solution or boiling water. Of course, all invalids using handkerchiefs, rags, or Japanese paper as receptacles for expectoration, are in danger of infecting their hands, and should always wash them thoroughly before touching food.

B. *Disinfection of the Sick Room.*—The rooms occupied by a tuberculous patient should be thoroughly disinfected at regular intervals, since it is possible that even with great care the furniture, floors, walls, etc., may have been infected. Even the occasional disinfection of the personal effects of the patient is advisable. In case of decease it is, of course, self-understood that everything the consumptive might have come in contact with, particularly furniture, bedding, clothing,

books,* etc., should be thoroughly disinfected. In many communities such disinfection is now attended to by the boards of health. Where the aid of the health board can not be secured the following directions will enable one to make a thorough disinfection by formaldehyde gas: 1. All cracks or openings in the plaster, in the floor, or about the doors and windows should be caulked tight with cotton or strips of cloth. 2. The linen, quilts, blankets, carpets, etc., should be stretched out on a line in order to expose as much surface as possible to the disinfectant. They should not be thrown into a heap. Books should be suspended by their covers, so that the pages will fall open and be freely exposed. 3. The walls and the floor of the room and the articles contained in it should be thoroughly sprayed with water. If masses of matter or sputum are dried down on the floor, they should be soaked with water and loosened. No vessel of water should, however, be allowed to remain in the room. 4. One hundred and fifty cubic centimeters (five ounces) of the commercial forty per cent. solution of formalin for each one thousand cubic feet of space should be placed in the distilling apparatus and be distilled as rapidly as possible. The keyhole and spaces about the door should then be packed with cotton or cloth. 5. The room thus treated should remain closed at least ten hours. If there is much leakage of gas into the surrounding rooms, a second or third distillation of formaldehyde should be made at intervals of two or three hours.

To be sure that the work is well done, it is always best to have it supervised by a physician. To managers of hotels and boarding houses in health resorts, this method of disinfection is particularly to be recommended, and the disinfection

*The possibility of transmitting tuberculosis through books has been demonstrated, particularly if the patient has been in the habit of moistening his fingers with saliva while turning the leaves.

of rooms occupied by consumptive guests should always take place immediately after their removal.

In some cities and villages tuberculosis seems to cling to certain localities and houses. The disease appears in a veritable endemic form, that is to say, it is always present there, either from the fact that careless tuberculous patients have lived for years in these houses, or owing to the equally important fact that the soil on which they are built, or the manner in which they have been constructed, is such as to favor the retention of the tuberculous infection indefinitely. When a thorough sanitary overhauling does not suffice to stamp out these sources of infection, the destruction of such dwellings seems the only remedy.

CHAPTER V.

WHAT CAN BE DONE TO PROTECT OURSELVES FROM THE SMALL PARTICLES OF SALIVA CONTAINING BACILLI, THROWN OUT BY THE CONSUMPTIVE DURING DRY COUGH, LOUD SPEAKING, OR SNEEZING?

There is real danger from this source of infection only when one remains a considerable length of time very near the tuberculous patient while he coughs or speaks. At a distance of three or four feet the danger practically ceases. The relatively few bacilli which are expelled with the saliva during the dry cough, sneezing, or loud speaking, are probably never thrown further than three feet, and fall rapidly to the ground.

But even the lesser danger which may arise from the bacilli having fallen to the floor with the particles of saliva must be prevented. They must not be allowed to accumulate and so be blown up with the dust into the air. Therefore the floor of the room of a tuberculous patient should never have any fixed carpet and even the wooden floor should never be swept with a broom, but should be frequently wiped up with a wet

cloth or with crude oil. Dusty furniture should be cleaned in the same way. Plush, velvet, or cloth covered furniture, heavy curtains or other fancy decorations, which might serve as dust-catchers, should not be allowed in the room of a tuberculous patient. Leather-covered, rattan, and plain wooden furniture are certainly the best, and the curtains should always be of washable material. Fancy curtains of cloth, velour, or silk, which accumulate dust and keep the air and sun out of the rooms, should be discarded.

If at all possible, every patient should have his own room, but he should always have his own bed. For a well person to sleep in a bed very close to a tuberculous patient is almost as dangerous as to sleep together in one bed.

Friends, relatives, and nurses should not remain very near the patient longer than necessary, and the tuberculous invalid should be urged always to hold a handkerchief before his mouth and nose while coughing and sneezing. He should, furthermore, be advised to carry two handkerchiefs with him always: one to hold before his mouth and to wipe it with after having expectorated; the other to use only to wipe his nose. By being careful with the use of his handkerchiefs, the danger of infecting his nose and bronchial tubes will be materially lessened.

All dirty linen (sheets, pillow-cases, underwear, napkins, handkerchiefs, etc.) used by the consumptive, should not be handled more than necessary, but should be placed in water as soon as possible after removal from bed or body. It is better to wash these articles separately, and only after having been thoroughly boiled should they be put with the common laundry. Wherever it is not possible to carry out these precautionary measures in their entirety, one should strive to follow them as far as it is in one's power.

CHAPTER VI.

HOW MAY MAN GIVE TUBERCULOSIS TO ANIMALS?

In one of the preceding chapters we have spoken of the importance of elevated spittoons to protect domestic animals, such as cats, dogs, etc., from the danger of becoming tuberculous by licking up tuberculous expectoration. By the careless expectorating of consumptives in meadows, fields, or stables, animals may become infected with the disease. The following very instructive fact came to the notice of the author of this essay: In an institution for the treatment of consumptives, managed by Sisters of Charity, and where, I am sorry to say, there was not enough strict medical supervision, there existed only certain rules concerning the care of the expectoration within doors; outside of the institution the patients were at liberty to do as they liked, and they expectorated wherever they pleased in their daily walks in the nearby meadows. A neighboring farmer who, some time before, had bought five healthy cows, had them retested, with the result that two were found to be tuberculous. He had the tuberculous cows killed, the stable cleaned and disinfected, and no longer allowed the patients of the neighboring sanatorium to promenade in the meadows where his cows pastured, and no more tuberculosis appeared among his cattle.

Now, although it is true that the sun and the air ultimately destroy the germs of the tuberculous sputum, it is not wise to rely upon this. Tuberculous substances may do harm by being licked up by animals before the sun and air have had time to kill the bacilli, and in dark and damp places it often takes a long time before atmospheric influence renders the tuberculous matter absolutely inoffensive.

The stools of patients suffering from tuberculosis of the intestines should be disinfected by a five-per-cent. solution of

carbolic acid. The superficial burying of tuberculous meat or tuberculous expectoration without previous thorough disinfection must be considered dangerous.

CHAPTER VII.

HOW CAN WE GUARD AGAINST GERMS OF TUBERCULOSIS IN OUR FOOD?

Whenever one is not reasonably certain that the meat he eats has been carefully inspected and declared free from disease germs, it should be very thoroughly cooked. By this means one is certain to kill all the dangerous micro-organisms. Against the sale of tuberculous milk there are very excellent laws in some states of the Union, which are rigorously enforced. In some the laws are less good, and in some there are no laws at the present time.

In justice to farmers and dairymen it must, however, be said that there are many who do their very best to protect themselves and their fellow-men from the danger of tuberculosis. They have their cows tested regularly, destroy the animals which are found to be tuberculous, and keep their stables and utensils for milk as clean as possible.

Unless one can be reasonably sure that the cows from which the milk is derived are healthy and not tuberculous, the milk should be boiled or sterilized before use, more especially when it is intended as food for children. Milk obtained from stores and from milk peddlers should invariably be submitted to boiling or sterilization. When milk is kept slowly boiling for five minutes, all the bacilli are killed, and the same result is obtained by the sterilizing process, that is to say, to keep the milk heated for at least half an hour at a temperature of 70° C. or 160° F. There are now in the market a number of cheap and practical apparatuses for sterilizing milk, which can be obtained at almost any drug store.

CHAPTER VIII.

IN WHAT OTHER WAYS MAY THE BACILLI OR GERMS OF CONSUMPTION ENTER THE INTESTINAL TRACT?

Since the tubercle bacillus may be found in the saliva of a tuberculous patient, it is best never to kiss such a person on the mouth. The habit of caressing or kissing domestic animals (parrots, canary birds, dogs, cats), many of whom are tuberculous, is equally dangerous, for through such habits these animals can certainly transmit tuberculosis to man.

Tuberculous patients should have their own drinking glasses, spoons, forks, etc.; or, at least, all table utensils which have served the tuberculous patient should be boiled after use.

The patient should never, out of false modesty, swallow his expectoration. He will thus avoid the danger of contracting intestinal tuberculosis. How important this warning is may become evident from observation of the tuberculous insane. These unfortunate people, with whom hygienic education is impossible, often swallow their expectoration, and as a consequence intestinal tuberculosis or consumption of the bowels is very frequent among them. Every consumptive patient should remember never to touch food before having washed his hands very thoroughly. Even with the greatest care it is possible that he may have soiled his hands with tuberculous expectoration.

CHAPTER IX.

HOW MAY TUBERCULOSIS BE CONTRACTED THROUGH INOCULATION (PENETRATION OF TUBERCULOUS SUBSTANCES THROUGH THE SKIN)?

Inoculation of tuberculosis happens perhaps most frequently through injuries received while cleaning nicked or chipped glass or porcelain cuspidors which had been used by

consumptives. It is also possible for the bacilli to enter the circulation if the person cleaning the spittoons happens to have a wound or open sore on his hand. Persons entrusted with the care of the spittoons in a private home or an institution for consumptives should wear rubber gloves while cleaning these vessels.

At times the patient may inoculate himself by placing an accidentally injured finger in his mouth, or by carelessly soiling an open wound with his expectoration.

Physicians, students of medicine or veterinary science, butchers, etc., are also exposed to the danger of wounding themselves with instruments which may have come in contact with tuberculous matter. Extreme care is the only remedy for all persons thus exposed.

If one has been unfortunate enough to receive an injury and tuberculous inoculation is feared, the best thing to do is to let the wound bleed freely, wash it thoroughly with water that has been boiled with a five-per-cent. solution of carbolic acid, or with pure alcohol; dress the wound with a clean rag dipped in any of these liquids, and seek as soon as possible the advice of the physician.

By tattooing tuberculosis has been transmitted in various instances, because the operator was a consumptive. Men who follow the profession of tattooing have, as a rule, the habit of dissolving the colors, necessary for their work, with their own saliva, hence the infection. The best thing, therefore, is never to permit such barbaric decorations on one's body.

Of less frequent causes of propagating tuberculosis, but which, in the light of modern sanitary science, can and should be prevented, we will cite the ritual act of circumcision, practiced according to Jewish rites, when the operator happens to be consumptive. It is also well known that, through lack or skill in after-treatment, secondary hemorrhage and wound

infection have ensued. Too many a young life has thus been needlessly sacrificed. The operation of circumcision, when skilfully and rapidly performed, is in itself trifling, but the sucking of the prepuce afterward makes it dangerous. Since it will be difficult to stop this practice by a simple protest on the part of physicians, and as the law cannot interfere with the free exercise of a religious rite, I should suggest as a remedy that only such persons should be allowed to perform circumcision as have shown the necessary skill before a medical board of examiners, and that every time they are called upon to perform the rite, they should submit themselves to a medical examination. Only when bearing a certificate from a regular physician, stating their absolute freedom from specific disease, should they be allowed to perform ritual circumcision.

As another reliable measure against the possibility of inoculating the child, when the parents insist upon the orthodox method of circumcision, is the suction by the aid of a glass tube, as practiced in France and Germany.

CHAPTER X.

WHAT OTHER FORMS OF TUBERCULOSIS EXIST, AND WHAT ARE THEIR PRINCIPAL SYMPTOMS?

In the foregoing chapters we have treated of the bacillus of tuberculosis, its mode of entrance into the system, and of the symptoms of the most frequent form of the disease—that is to say, consumption or pulmonary tuberculosis. Now we will consider some of its other forms or manifestations.

More closely related to consumption than any other form of tuberculosis is laryngeal tuberculosis, also called tuberculosis of the larynx, or tuberculosis of the throat. This disease is not nearly so frequent as pulmonary tuberculosis, but sometimes occurs with it. Besides all the symptoms which

tuberculosis of the throat has in common with tuberculosis of the lungs, such as fever, night-sweats, emaciation or loss of flesh, difficulty in breathing, cough, etc., there are in this disease additional symptoms, such as more or less pronounced hoarseness and frequent and intense pain during the act of swallowing, which makes eating bread, meat, and other solid food exceedingly difficult. The internal appearance of the throat shows little tuberculous growths and ulcers in the region of the vocal cords and neighboring tissue.

Tuberculosis of the bones, which not infrequently leads to a total necrosis—that is, a softening and final decay of the bones—is not a rare disease. If the seat of the disease is the spinal column, the decay of one or more vertebrae may result in the deformity commonly known as hunchback. If through this breaking down there should result a compression of the spinal marrow, paralysis of arms or legs, and other disturbances, such as difficulty in retaining the urine and the stools, may be observed.

While tuberculosis of the bones and joints is almost painless at the beginning, it may gradually lead to loss of the use of the joints, to maturation and destruction, which may become extensive enough to make even amputation necessary.

In younger children tuberculous spinal meningitis is not rare, and, alas! very often proves fatal. The essential symptoms of this disease are digestive disturbances (vomiting or constipation), uneasiness and depression, later on paralysis of the extremities, delirium, and sometimes coma (profound insensibility).

More frequent and almost as dangerous as tuberculous meningitis in children, is tuberculosis of the intestines and the peritoneum (the lining of the abdominal cavity). This affection is sometimes also called consumption of the bowels. The most pronounced symptom in such cases is very often a

protracted diarrhœa, which cannot be easily controlled by dieting or medication.

At times the whole body is invaded by the tuberculous disease, and countless little tubercles are distributed in all the organs. This disease is then called "miliary tuberculosis" because the tubercles are like millet seed. The origin of this disease is probably always due to the sudden outbreak of a localized tuberculous lesion, which had been at a standstill before. The first symptoms of miliary tuberculosis resemble those of typhoid fever. They are generally depression, lassitude and fever. This is also one of the forms of tuberculosis which often prove fatal.

Of the so-called localized tuberculous diseases, we must mention the form which manifests itself as a skin disease and is known as lupus, showing itself as ulcerous patches mainly on the face.

So-called scrofulosis, or scrofula, is now considered also as a form of tuberculosis. It appears almost exclusively during childhood. It is a milder disease than the other forms of tuberculosis, and manifests itself mainly in swelling of the glands, eruption of the skin, and inflammation of eyes and ears.

CHAPTER XI.

WHAT PROTECTS THE HEALTHY INDIVIDUAL FROM CONTRACTING TUBERCULOSIS?

After all that we have said of the contagiousness, or rather the communicability, of tuberculosis, and consumption in particular, one must not think that a breath in an atmosphere accidentally laden with bacilli would certainly render a healthy individual consumptive, or that by a swallow of tuberculous milk or a little injury from a broken cuspidor one must necessarily become tuberculous. The secretions of our nasal

cavities, doubtlessly also the blood, and the secretions of the stomach of a healthy individual, have bactericidal properties; that is to say, they kill the dangerous germs before they have a chance to do harm. Therefore, the healthy man and woman should not have an exaggerated fear of tuberculosis, but they should, nevertheless, not recklessly expose themselves to the danger of infection.

CHAPTER XII.

HOW MAY ONE SUCCESSFULLY OVERCOME A HEREDITARY DISPOSITION TO CONSUMPTION?

The mother who fears for her future child a hereditary disposition to tuberculosis should lead a very healthful life. She should be as much in the open air as possible, breathe deeply and eat regularly of plain but nourishing food. Never should she wear garments which constrict any of her chest or abdominal organs. She should replace the corset by a comfortable waist which permits free and deep respiratory movements. Instead of tying her skirts around her waist, she should have them suspended from the shoulders, which can easily be done by attaching buttons to the waist. By wearing a close-fitting union suit for underwear, of wool or cotton according to the season, it will be possible to get along with less skirts, and thus lessen the weight around the waist. The whole dress of the mother should be so arranged that there are no constricting bands, and that no organ in the body should be hindered in its free physiological functions. How important a more healthful and natural dress really is for the welfare and development of mankind in general, a mother seldom realizes either for herself or for her daughters. They are all only too often the slaves of fashion. The tightly laced corset should be banished forever from the dress of women. Not

only is free and natural breathing interfered with by this articles of dress, but indigestion and disturbances in the circulation follow excessively tight lacing. Anæmia, or poverty of the blood, so often observed in young girls, can very frequently be ascribed to this unnatural mode of dress, which does not permit either a free circulation or sufficient oxygenation of the blood.

We reproduce here three pictures better to illustrate the result of excessive lacing. Fig. 11 shows the situation of the organs in chest and abdomen in a normal thorax. Fig. 12

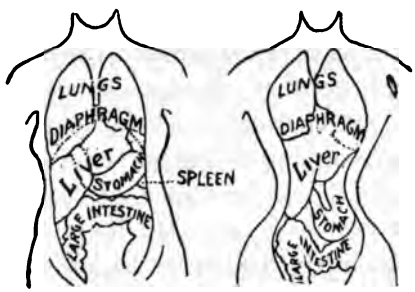

FIG. 11.

FIG. 12.

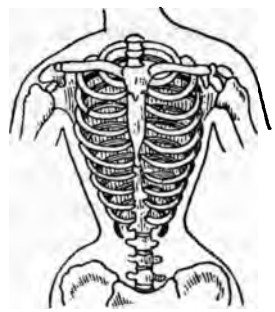

FIG. 13.

shows lungs, heart, and intestines as they appear in a thorax constricted by wearing a tightly laced corset for a number of years. Fig. 13 shows the skeleton of a chest deformed by tight lacing.

The wearing by men of belts instead of suspenders is not to be recommended. In order to keep the trousers in place the belt must be considerably tightened; the result is constriction of the abdomen, hindering the natural action of the intestines which is essential to good digestion. Hernias (ruptures) may also be the result of this mode of dress. It cannot be insisted upon too often that in an individual predisposed to tuberculosis nothing can be more injurious than an

interference with proper digestion and assimilation. To keep stomach and bowels in good order is one of the best safeguards against taking the disease.

Neckwear, for men as well as for women, should be loose. Tight and constricting collars or bands around the neck may cause an insufficient air supply, congestion of the arteries of the brain, and subsequently headache and dizziness. To dress the neck too warmly lessens the power to resist taking cold when there happens to be a change in the atmosphere. The less one is accustomed to bundling up the neck, the less liable will he be to take cold.

Ladies cannot be told too often to abandon the unhygienic fashion of trailing dresses, at least in the street. They should be brave and show the world that they care for the health and welfare of others. When one considers how many millions of dangerous bacilli and micro-organisms are gathered up with the dust and brought into the house by this unhealthy mode of dress, further argument is hardly necessary to prove that the wearing of trains is absolutely dangerous to health. As the poet of the London *Truth* puts it in his "Song of the Skirt," why should dresses be made to do "the scavenger's dirty work":

"Sweep—sweep—sweep—
Where the waste of the street lies thick,
Sweep—sweep—sweep—
However our path we pick;
Dust, bacillus, and germ,
Germ, bacillus, and dust,
Till we shudder and turn from the sorry sight
With a gesture of disgust.

"Oh, men with sisters dear!
Oh, men who have well-dressed wives,
It is not alone an expensive mode,
It is one that hazards lives!
For malignant microbes swarm
In the triturated dirt,
And the dress that sweeps it up may prove
A shroud as well as a skirt!"

Footwear is also a matter of importance. Shoes should never be worn too tight. They not only hinder free movements, but the constriction of the blood vessels causes impaired circulation and coldness of the extremities.

If it is found necessary to wear underwear at night, a different set should be kept for that purpose, which, with the night dress or night shirt, should be well aired during the daytime.

Whenever a mother has a tendency to tuberculous disease, the child should be given a healthy wet-nurse, or be fed artificially with modified cow's milk. The advice of the physician is indispensable under such circumstances. The child should have its own bed, and should never, never sleep in the same bed with the mother. The bedroom should always be well ventilated, and the child should be taken into the open air as soon as practicable. The old-fashioned habit of enveloping the child's head in a thick veil should be abandoned. It is a good plan to let the little one run about naked or with only a little shirt on, for a while every day in a warm, sunny room. A bare wooden floor or a square of closely woven matting, that can be kept scrupulously clean, is much to be preferred to dust-collecting carpets.

From the tenth to the twelfth month one should accustom the child gradually to cold baths. The best way to begin is after its daily warm bath to rub the child a few times with the hands dipped in cold water, and then wipe it rapidly. By and by one may begin with cold sponging, and later on with a little douche. In the use of cold water it is absolutely necessary that the reaction should rapidly follow. This reaction is manifested by a pleasant warmth perceived by the child, and externally is made visible by a reddish appearance of the skin. Whenever cold water is applied to the skin one will notice at first a certain whiteness or pallor, which is

caused by a contraction of the external blood vessels. The return of the blood to the external surface causes the reddening of the skin. Whenever reaction is lacking or tardy, the advice of the physician should be sought.

Though the application of cold water is beneficial, one should never forget that there are people whose constitutions differ, and that a routine treatment is not applicable to every individual. The careful, judicious, and regular application of cold water is perhaps one of the best preventive measures against taking cold, for children as well as adults, and its use generally should be more recommended. Persons not accustomed to the use of cold water can easily become so by being rubbed every day with alcohol for a week or so. During the second week they should be rubbed with half alcohol and half water, and the third week with water alone. By this means one gradually educates one's self to the use of cold sponge baths, ablutions, and douches.

Every family does not have the luxury of a douche apparatus, and sometimes not even a bathroom. For such I wish to describe a simple method which will answer the purpose. Take a large circular English bath tub, about three feet in diameter and ten inches high, and pour about five inches of cold or tepid water into it. The bather jumps into the water, keeping his feet in motion for a few seconds, and pours one or two pitcherfuls of water quickly over each shoulder, thoroughly wetting the whole body. It is not at all essential that the head should be wet at the same time. The douche can be made easier by the help of a second person to pour the water from the pitcher or watering pot. If a hose can be attached to a nearby faucet, a douche, needle bath, or direct jet can be improvised. The temperature of the water may vary from 60° to 40° F. The room in which the bath is taken should be warmed in cold weather. The best and, per-

haps, also most convenient time to take a cold bath is in the morning before dressing, or in the evening before retiring. Whenever reaction is feeble, that is to say, when a pleasant feeling of warmth after the bath does not come quickly enough, one should proceed as follows: If the bath is to be taken in the morning rise half an hour earlier, cover the bed so that the warmth is retained; then, after the application of cold water has been taken rapidly in the manner above described, rub with a rough Turkish towel and return as quickly as possible to the warm bed. If it is not practicable to take the bath in the morning, one can obtain the same result by going to bed half an hour earlier, and when the bed is warm rise again to take the cold water application. In most cases the return to the warm bed will assure a thorough reaction; but if these precautions, in addition to vigorous friction after the bath, do not suffice to produce a proper reaction, it is a sign that the body has not enough resistance for this kind of treatment, and the physician should be consulted.

Cold baths, especially bathing in a river or in the ocean, are, of course, to be recommended in warm weather. Weakly and elderly persons should not take cold baths, no matter at what season, unless permitted to do so by their physician.

To keep the skin clean and in good condition, cold baths, even when taken every day, are not always sufficient, and soap and warm water should be used at least once a week. The warm bath should always be followed by a rapid sponging off with cold water.

As soon as the intelligence of the growing child will permit, it should be taught to breathe deeply, and later on be taught to take the following breathing exercises, which the child should learn to love as the average boy or girl loves general gymnastics. In front of the open window or out of doors assume the position of the military "attention," heels together,

body erect, and hands on the sides. With the mouth closed take a deep inspiration (that is, breathe in all the air possible), and while doing so raise the arms to a horizontal position; remain thus holding the air inhaled for about three seconds,

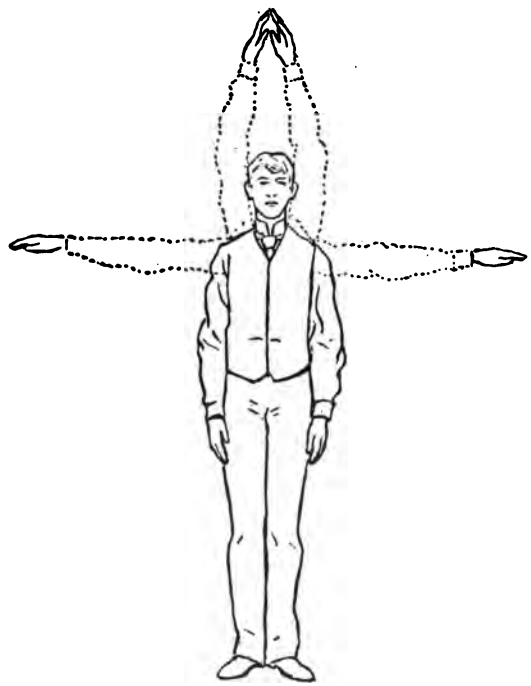

FIG. 14.—First and Second Breathing Exercises.

and while exhaling (breathing out) bring the arms down to the original position. This act of exhalation, or expiration, should be a little more rapid than the act of inspiration. When the first exercise is thoroughly mastered and has been practised for several days, one may begin with the second exercise, which is like the first, except that the upward movement of the arms is continued until the hands meet over the head.

The accompanying illustration (Fig. 14) shows the positions which are to be taken during those two exercises. The third breathing or respiratory exercise, which requires more strength and endurance, should not be undertaken until the

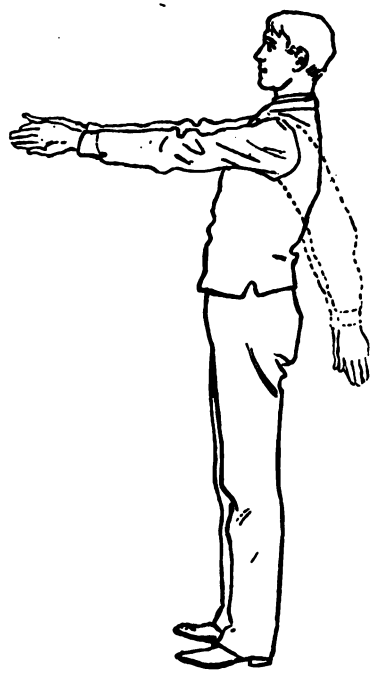

FIG. 15.—Third Breathing Exercise.

first two have been practised regularly several times a day for a few weeks, and until an evident improvement in breathing and general well-being has been observed. We will endeavor to make this third exercise, which might be called a dry swim, more comprehensible by the illustration (Fig. 15). Take the same military position of "attention," and then stretch the arms out as in the act of swimming, the backs of

the hands touching each other. During the inspiration move the arms outward until they finally meet behind the back. Remain in this position a few seconds, retain the air, and during the exhalation bring the arms forward again. This somewhat

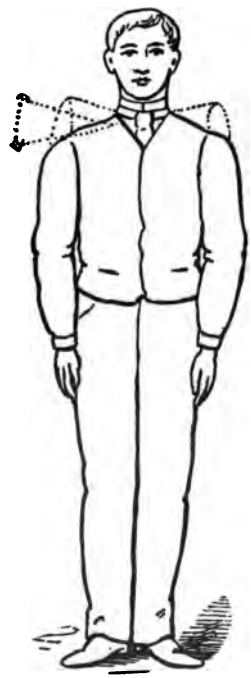

FIG. 16. — Breathing Exercise with Rolling of Shoulders.

difficult exercise can be facilitated and be made more effective by rising on the toes during the act of inhalation, and descending during the act of expiration.

Of course, when out of doors one cannot always take these exercises with the movement of the arms without attracting attention; under such conditions raise the shoulders, making a rotary backward movement during the act of in-

haling; remain in this position, holding the breath for a few seconds, and then exhale while moving the shoulders forward, assuming again the normal position. This exercise (Fig. 16)

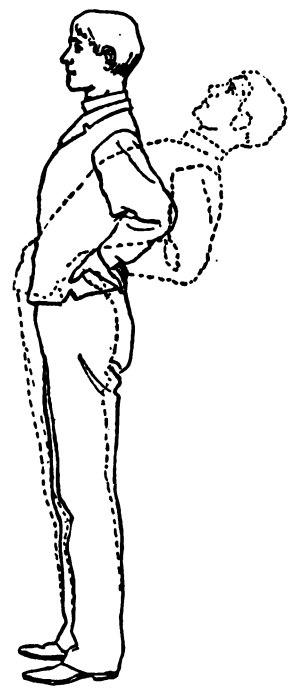

FIG. 17.—Exercise for People in the Habit of Stooping.

can be easily taken while walking, sitting, or riding in the open air.

Young girls and boys, and especially those who are predisposed to consumption, often acquire a habit of stooping. To overcome this the following exercise (Fig. 17) is to be recommended. The child makes his best effort to stand straight, places his hands on his hips, with the thumbs in front, and then bends slowly backward as far as he can during the act of

inhaling. He remains in this position for a few seconds, while holding the breath, and then rises again somewhat more rapidly, during the act of exhalation.

The following general rule concerning breathing exercises should always be remembered. Commence with the easier exercises (Figs. 14 and 16), and do not begin with the more difficult ones (Figs. 15 and 17) until the former are completely mastered. Take from six to nine deep respiratory exercises, either of one kind or the other, every half hour, and continue this practice until deep breathing has become a natural habit. These exercises should always be taken in an atmosphere as fresh and as free from dust as possible. Never take these exercises when tired, and never continue so long as to bcome tired.

Mouth-breathing in children, and sometimes in adults, is often caused by certain growths in the throat (adenoid vegetation), by enlarged tonsils, or by growths in the nose (polypi, etc.). The removal of these obstructions by surgical aid is perhaps the only rational method to assure natural breathing. Incidentally, we may be permitted to say that these operations are not at all dangerous; but by the presence of these vegetations in the throat (retropharynx) the hearing and the intellectual and bodily development of the child may become seriously impaired. The early removal of such growths should be earnestly recommended. The respiratory exercises just described are particularly useful for such children after operation, otherwise they might retain the habit of imperfect breathing which they had acquired.

Among exercises which have a tendency to develop and strengthen lungs and throat, we will also mention singing and reciting in the open air.

Not only during the day, but also at night, there should be a desire for fresh air. The still very prevalent idea that

night air is injurious is wrong. The night air is purer than that of the day, particularly in great cities; therefore one should always keep at least one window open in the bedroom or in an adjoining room, and thus assure a sufficient and permanent ventilation. Of course, it is always wise to protect one's self against direct draughts from the open window. When it is not possible to place the bed so that it will be out of the draught, a screen in front of the open window will suffice for protection.

It is, of course, self-understood that all individuals who have an inherited disposition to tuberculosis should always endeavor to live as much as possible in good, fresh, pure air. To visit dancing-halls, saloons, and smoking-rooms can only be deleterious to such people. Smoking should be absolutely prohibited for young men with weak chests, and for all people having a tendency to tuberculosis. The smoking of cigarettes is particularly dangerous, since the habit once acquired tends to undermine even a strong constitution.

Many of our American dwellings in winter are heated altogether too much. A temperature of from 65° F. to 68° F. should be sufficient, especially when care is taken that the heat produced by the furnace is not too dry. The excessively dry atmosphere in winter of many city and country homes often gives rise to nasal catarrh, a condition which everybody, but especially those suffering from pulmonary diseases, or prone to them, should be anxious to avoid. Besides keeping the water pan in the furnace constantly filled, there should be in the sitting-room and sleeping-room some humidifying arrangement such as is pictured here (Fig 18). More simple evaporating devices, however, as a vessel filled with water and a cloth suspended above it touching the water so as to produce capillary attraction, will answer the purpose of rendering the atmosphere sufficiently humid.

The proper bringing up of children that have a tendency to become tuberculous is of the greatest importance. Many are poor eaters from the day of their birth. Discipline, not to allow too many sweets, to observe regular meal-times and to keep the bowels in good condition, are the best means to combat a dislike for eating. As early as possible children should be taught to clean their teeth thoroughly after each meal, for a good digestion is dependent upon the condition of the teeth. The dislike to play outdoors, which is so characteristic of the

FIG. 18.—Humidifier.

little candidates for tuberculous diseases, can also be overcome by discipline. To dress them too warmly and bundle them up all the time is as injurious as having them remain most of the time indoors. Such children should not work too hard during their school age. To spend too many hours sitting down, to do too much brain work, to spend too much time at the piano or in other musical studies, have a tendency often to weaken seriously the child predisposed to tuberculosis.

Gymnastic exercises should be recommended to young people of both sexes, and young girls especially should con-

tinue their healthful outdoor sports after they have left school. Of course, excesses are injurious in everything, and we wish to say here that, no matter how healthful a sport may be, if carried on too violently or for too long, it must ultimately prove injurious. To be cheerful, to live a regular life, to eat plain but good food, to avoid all alcoholic beverages, to see that the bowels move freely every day, to keep the whole body clean, and to sleep at least eight hours out of the twenty-four, is the best way to remain well.

Once more we desire to call attention to the clothing of growing girls and boys. The thickness of the garment should be according to the season, and they should always be made so that every movement of the body may be free, and none of its functions, such as respiration, digestion, etc., in any way interfered with.

When the time comes to choose a profession or trade for a young man who has a tendency to tuberculosis, one should bear in mind that gardening, farming, forestry, and all occupations which demand an outdoor life, are the most likely to make him a strong man and a useful member of society.

In connection with the precautions which should be taken to combat a tendency to tuberculosis, we must say a few words concerning the curability of consumption or pulmonary tuberculosis. The old idea—still, alas! very prevalent and deeply rooted in the minds of many people—that a tuberculous individual who has seemingly inherited his tendency to the disease, can have no hope of cure, is wrong. We desire to emphasize the fact that the chances for a cure of the consumptive individual does not at all depend upon whether he had a hereditary tendency, or has accidentally acquired the disease. There are hundreds of cases of healed tuberculosis in men and women

who have lived to old age, and nevertheless their fathers or mothers had succumbed to consumption.

The assumption that tuberculosis is often directly transmitted from parent to child is equally erroneous. Of course, there are in medical literature a few cases which show that such direct transmission is possible, but they are exceedingly rare. When little children have become tuberculous the infection can almost always be traced to the child having slept or been much in contact with a consumptive mother or other consumptive individuals, having been kissed on the mouth, or having played on the dirty, infected floor, etc. All this shows the importance of absolute cleanliness and the strictest hygiene from early infancy.

CHAPTER XIII.

HOW CAN A PREDISPOSITION TO TUBERCULOSIS, OTHER THAN HEREDITARY, BE CREATED OR ACQUIRED?

1. By the intemperate use of alcoholic beverages, a dissipated life, excesses of all kinds, etc.

2. By certain diseases which weaken the constitution; for example, pneumonia, typhoid fever, smallpox, measles, whooping cough, syphilis, influenza, etc.

3. By certain occupations, trades, and professions, such as printing, hat-making, tailoring, weaving, and all occupations where the worker is much exposed to the inhalation of various kinds of dusts, as bakers, millers, confectioners, cigar-makers, chimney-sweepers, and the workers in lead, wood, stone, metals, etc.

CHAPTER XIV.

HOW MAY AN ACQUIRED PREDISPOSITION BE OVERCOME, AND SEEMINGLY UNHEALTHY OCCUPATIONS MADE RELATIVELY HARMLESS?

All persons who have been weakened through intemperance or excesses, who are convalescent from serious disease, or who are suffering from the effects of harmful occupations, should not associate with consumptives. For the intemperate man, the fast liver, or one inclined to excesses, there is no remedy except to change his mode of life. The unfortunate who by his own fault or the carelessness of others has fallen a victim to a venereal disease (syphilis, etc.), we would urgently recommend to submit himself to thorough treatment by a competent physician. For the comfort of these unfortunate sufferers, we desire to say that all venereal diseases can be successfully treated when the patient seeks timely medical advice and obeys the physician's instructions faithfully. Since venereal diseases are highly contagious, the physician's instructions will also protect others from becoming infected, and the patient himself from reinfection. The necessity of seeking medical advice holds good for all those who by intemperance or excesses of any kind have undermined their constitution, and thus diminished their natural resistance to the invasion of the tubercle bacilli.

In many states of the Union there now exist laws whereby the sanitary conditions of factories, workshops, department stores, etc., are assured. Of course, there is room for much improvement in this respect, especially in regard to light and sufficient ventilation in factories where dust and gases are a constant menace to the laborer. Whenever practicable, respiratory masks for protection against particularly irritating dust, should be worn. People much exposed to the inhalation of

flour dust should clean their teeth thoroughly (the inside as well as the outside). By removing the flour dust from the spaces between the teeth, the formation of glucose (sugar) through the action of the saliva on the flour is avoided, and thus the germs of fermentation are deprived of a favorable soil for development.

In all these matters the laborer can help himself a good deal by his own efforts to make a seemingly dangerous occupation more safe. During the hours of recess, and before he goes to work as well as afterwards, he should always strive to be as much as possible in the open air, drink plenty of pure, clean water, keep early hours, live as regular a life as possible, avoid the saloon, and never take alcoholic beverages.

All the other hygienic precautions and means of improving the general health of which we have spoken in Chapter XII, "How may one successfully overcome a hereditary disposition to tuberculosis?" such as breathing exercises, the use of cold water, etc., are, of course, just as essential to combat a disposition to tuberculosis which has been acquired.

CHAPTER XV.

WHAT CAN WELL-MEANING AND CONSCIENTIOUS EMPLOYERS IN CITY AND COUNTRY DO TO HELP COMBAT TUBERCULOSIS?

All who employ a number of people and provide their lodgings should bear in mind that unhealthy, dark, damp, and badly ventilated rooms are powerful factors in the propagation of tuberculosis. The soil upon which a dwelling for human beings is to be built, should be dry, free from miasms and dangerous exhalations. High, porous ground is particularly to be recommended. It is sometimes possible to render a damp soil healthful by thorough drainage and cementing. The house *should* always be built of good material, and all the rooms

should receive the light of day and as much sunshine as possible. In winter the rooms should be well warmed, but not overheated, and at the same time free ventilation should be made possible. Bathrooms in sufficient number should be in all model tenement houses, and each family should have its own water-closet, which, of course, must always be kept in good condition.

In labor colonies and densely populated tenement districts, where modern bathing facilities cannot be easily installed, there should be public places where, for a moderate price, people can enjoy the cleansing and refreshing luxury of a warm or cold bath.

In factories, workshops, big stores, etc., there should always be a sufficient number of spittoons, preferably elevated and of unbreakable material. Wherever such precautions are taken and some conspicuous signs, forbidding expectorating on the floor, put up, and if necessary making it punishable by law, promiscuous spitting will soon cease, and an important point in the combat of tuberculosis will be gained.

All employees, men and women of whatever class, should be allowed ample and regular time for their meals, which should never be taken in the workshops. Special rooms should be kept for that purpose. Opportunity should be given to the workers to rest or walk in the open air for a little while after their meal. It is also of importance for the health of the laborer to wash his hands thoroughly before touching food, and proper conveniences should be provided for that purpose. Factories, workshops, large stores, etc., should, of course, be well ventilated, but it is particularly necessary that they should be thoroughly aired after working hours. These precautions apply not only to large establishments, but to the smallest concern with one or two employees as well, and every employer should bear in mind that a healthy laborer is of greater value

than one who is overworked, underfed, or badly housed. Lastly, employees should not be overworked. There should be reasonable hours for all, so that the laborer may enjoy the bodily and mental rest which is essential to the preservation of health. The germs of any disease, but particularly those of tuberculosis, will always find a more congenial soil for development in an overworked and enfeebled system. Child-labor, that is to say, the employment of children under fourteen years of age, in factories, workshops, mines, etc., should be prohibited by law. The child is more susceptible to tuberculosis than the adult, especially when its delicate growing organism is subject to continued physical strain.

CHAPTER XVI.

WHAT CAN THE FARMER AND DAIRYMAN DO TO DIMINISH THE FREQUENCY OF TUBERCULOSIS AMONG ANIMALS, AND THUS INDIRECTLY STOP THE PROPAGATION OF THE DISEASE AMONG MEN?

The farmer or dairyman who employs help should, of course, be as anxious for their physical welfare, for their proper housing and proper food, as the employer in the city. The dairyman or the farmer who keeps cows should, however, be particularly desirous to help in combating tuberculosis among animals.

Everybody who has anything to do with cows should be acquainted with the nature of tuberculosis in cattle, also known by the name "bovine tuberculosis." In animals as well as in man the direct cause of this disease is the tubercle bacillus. Bovine tuberculosis is prevalent in nearly every country. The symptoms of the disease are much like those in man. They begin with relatively slight functional disturbances. The way the germ of tuberculosis is transmitted from animals to men, and also from men to animals, has already been explained.

The contagion, or rather the propagation, of the disease, among animals takes place in various ways: First, by drop infection, that is to say, little particles which are expelled during the seemingly dry cough. Secondly, by the discharge from the lungs, or also from the glands of the throat, coughed up in the ordinary way. Thirdly, through tuberculous matter coming from the bowels. Fourthly, through secretions coming from the sexual organs (vagina and uterus). Fifthly, through the milk if the udder is tuberculous, or if the whole body of the animal is invaded by the disease. Finally, the disease may be directly transmitted from the tuberculous cow to the calf.

As to the frequency of the various ways in which the contagion takes place and the best methods of prevention, the author does not believe that he can do better than to copy some of the very "Practical Suggestions for the Suppression and Prevention of Bovine Tuberculosis," issued by Dr. Theobald Smith, of the Bureau of Animal Industry in Washington:

"Fully nine-tenths of all diseased animals examined have been infected by inhaling the tubercle bacilli, dried or suspended in the air.

"Fully one-half of all diseased animals examined have been infected by taking tubercle bacilli into the body with the food. This implies that both food and air infection are recognizable in the same animal in many cases.

"Animals are infected, though rarely, during copulation. In such cases the disease starts in the uterus and its lymph glands, or in the sexual organs and corresponding lymph glands of the bull.

"Perhaps from one to two per cent. of all calves of advanced cases are born infected. Among the two hundred cases of tuberculosis, including all ages, which have been examined by the writer, there are about two per cent. in which the dis-

ease is best explained as having been directly transmitted from the mother during or before birth.

"We may define the dangers of infection somewhat more definitely by the statement that in any herd, even in those extensively infected, only a small percentage of the diseased animals, namely, those which are in an advanced stage, or such as have the disease localized from the very beginning in the udder, or the uterus, or the lungs, are actively shedding tubercle bacilli. It is these that are doing most, if not all, of the damage by scattering broadcast the virus.

"Disease of the udder is particularly dangerous, because the milk at first appears normal for some weeks, and therefore would be used with impunity. Moreover, the tubercle bacilli in the diseased gland tissue are usually numerous.

"Similarly, in tuberculosis of the uterus the vaginal discharges may contain many tubercle bacilli. These deposited anywhere may lead to the extensive dissemination of the virus, or it may be carried by the bull to other cows. A diagnosis may be made by the examination of any existing discharge for tubercle bacilli.

"The foregoing statements apply to individual herds only. To what extent does the danger extend beyond the diseased herd to others in the neighborhood? To this we may give the general answer that there is no danger unless the animals mingle on the pasture or in the stable. Tubercle bacilli are not carried in the open air, or if they are their numbers are so small that the danger of infection is practically absent.

"It is also highly doubtful whether they are ever carried in sufficient numbers by third parties from place to place to become in a sense a danger. The reasons for this must be sought for in the tubercle bacillus itself. The diseased animal is the only manufacturer of tubercle bacilli, as well as the chief disseminator. Tubercle bacilli, after having left the

body of the cow (and usually in small numbers), do not increase in nature, but suffer a steady decrease and final extermination in four to six months at the longest. Only after they have entered the bodies of susceptible animals, do they again begin to multiply. Hence, with this disease, the only danger to other herds lies in direct association, or in the transfer of a diseased animal or of milk from such an animal. The great danger exists in the immediate surroundings of the infected, and loses itself as the distance increases.

"PREVENTIVE MEASURES.

"The suggestions to be recommended are not to be considered as taking the place of any more sweeping and radical measures which have been contemplated by some states, and are actually being tried in others. We wish them to be considered simply as of educational value to the owners of cattle in their efforts to repress and stamp out the disease. The aid of the government in this matter is a question to be discussed by itself. Without individual co-operation and sacrifice, directed by an intelligent understanding of the disease in its various aspects, any efforts on the part of the government are likely to prove abortive, owing to the enormous interests involved.

"*Removal of Diseased Animals.*—This is the essential requirement in the suppression of tuberculosis. We have already stated that only in the diseased animals the tubercle bacilli multiply. Hence, if these are removed and the stables thoroughly disinfected, so that any germs shed by them are destroyed, we are safe in concluding that the disease has been suppressed.

"The disease in the early stages can be detected only with the aid of tuberculin. In the advanced stages most careful observers will probably recognize it, or at least suspect it, with-

out the use of tuberculin. Tuberculin, therefore, has become indispensable in giving the owner an idea of the inroads the disease is making in his herd, and in distinguishing the infected from the non-infected. Tuberculin reveals to us all stages, from the earliest, most insignificant changes, when the animal is outwardly entirely well, to the gravest and most dangerous types of the disease. Tuberculin does not, as a rule, discriminate between these cases. Hence, those who use it as a guide must not be disappointed when, after having killed the suspected ones, they find that many are in the earlier stages of the malady. Tuberculin, moreover, is not infallible. A small percentage of cases of disease are not revealed by it. On the other hand, a sound animal now and then gives the reaction of tuberculosis. These lapses must be borne in mind in using tuberculin. In spite of them, however, tuberculin must be considered as of great value in revealing tuberculosis not recognizable by any other means during life.

"The question next arises, What shall be done with the infected animals? This question is really composed of two distinct questions whose combination is mainly the cause of the present perplexity. From the standpoint of the agriculturist alone the matter is simple enough. The infected animals might be separated at once from the non-infected. The worst cases should be killed and buried deeply or burned. Those without outward signs of disease might be fattened for the butcher and inspected at the abattoir. This is the recommendation given by Nocard, a prominent French authority, and generally followed in European countries. But at this point public health appears and demands the prompt and complete destruction of all infected animals, however mild the disease, or, if the animal be not destroyed, the rejection of the milk of all infected animals. The interests of the stock owner and of public health are thus diametrically opposed. If the demands of

public health were in every sense justifiable, from a strictly scientific standpoint, there could be no question as to an entire submission to its demands. But the case is not so simple, and gives room for diversity of opinion. Leaving the public-health aspect of the question aside for the moment, let us return to the farmer's side of it. After all infected animals have been segregated or killed, as the case may be, and the stables disinfected, the remaining healthy animals should be retested with tuberculin within a certain period of time, from three to six months after the first test, to make sure that no disease has been overlooked. Future repetitions must be recommended, according to our present knowledge, for some cases may have been missed by the tuberculin, or the disease germs may possibly be reintroduced by tuberculous human beings, or by tuberculous cats, dogs or other domesticated animals.

"All animals introduced into a herd must have been tested and found to be sound beforehand. This is such a self-evident proposition that it needs no comment.

"In the absence of the tuberculin test, or of organized official inspection, the stock owner should carefully and promptly remove from his herd and have destroyed:

"(1) All animals which show emaciation, with coughing, and any suspicious discharges from the nose.

"(2) Those animals with enlarged, prominent glands about the head (in front of the ears, under or behind the lower jaw), or enlarged glands in front of the shoulder, in the flank, and behind the udder, and all animals having swellings on any part of the body which discharge a yellowish matter and refuse to heal.

"(3) Animals with suspected tuberculosis of uterus and udder.

"*Disinfection and Other Preventive Measures.*—It will probably require more or less time before the use of tuberculin

will have become generally established. Hence, preventive measures of a general character must still be kept in view for some time to come. These measures partly suffer shipwreck from the fact that it is difficult without tuberculin to recognize even advanced disease during life. Still, much can be done to reduce the amount of infection by following out certain general and specific suggestions which the renewed study of the disease has either originated or else placed on a more substantial basis.

"Perhaps the most important preliminary suggestion to be made is, that the owner of cattle should endeavor to familiarize himself as much as possible with the general nature of tuberculosis, its cause, the ways in which the virus may leave the body of the sick and enter that of the well, and, lastly, the ways in which it spreads within the body. He will, by the acquisition of such fundamental knowledge, lift himself above the plane where quackery and specifics abound, and understand precisely what to expect after the disease has entered his herd, and how to meet the demands of public health. He should, however, make himself acquainted with the peculiar appearance of tuberculous growths in the body, and open every animal that dies, so that he may know to what extent his animals are dying of this malady. Wherever possible the services of the skilled veterinarian should be made use of. Sanitary precautions should begin with the removal of diseased and suspected animals, as stated above. This is the most essential requirement, for diseased animals are the only breeding places of the specific virus.

"After the removal of these, attention should be paid first of all to the stables. Here, during the long confinement of the winter months, when ventilation is all but suppressed, we may look for the source of most of the inhalation diseases so common in tuberculous cattle. Even when only a few cases of tuberculosis have been found, the stables should be disinfected

by removal of all dirt and the subsequent application of disinfectants. Since tubercle bacilli are more resistant than most other disease germs, the strength of the disinfecting solution must not be less than as given. The following substances may be used:

"*(a)* Corrosive sublimate (mercuric chloride), one ounce in about eight gallons of water (one-tenth of one per cent.). The water should be kept in wooden tubs or barrels and the sublimate added to it. The whole must be allowed to stand twenty-four hours, so as to give the sublimate an opportunity to become entirely dissolved. Since this solution is poisonous, it should be kept well covered and guarded. It may be applied with a broom or mop and used freely in all parts of the stable. Since it loses its virtue in proportion to the amount of dirt present, all manure and other dirt should be first removed, and the stables well cleaned before applying the disinfectant. After it has been applied, the stable should be kept vacant as long as possible Before animals are allowed to return, it is best to flush those parts which the animals may reach with their tongues, to remove any remaining poison.

"*(b)* Chloride of lime, five ounces to a gallon of water (four per cent.). This should be applied in the same way.

"*(c)* The following disinfectant is very serviceable. It is not so dangerous as mercuric chloride, but is quite corrosive, and care should be taken to protect the eyes and hands from accidental splashing.

	"Gallon
"Crude carbolic acid.....	½
"Crude sulphuric acid.....	½

"These two substances should be mixed in tubs or glass vessels. The sulphuric acid is very slowly added to the carbolic acid. During the mixing a large amount of heat is de-

veloped. The disinfecting power of the mixture is heightened, if the amount of heat is kept down by placing the tub or glass demijohn containing the carbolic acid in cold water while the sulphuric acid is being added. The resulting mixture is added to water in the ratio of one to twenty One gallon of mixed acids will furnish twenty gallons of a strongly disinfectant solution having a slightly milky appearance.

"*(d)* Whitewash is not in itself of sufficient strength to destroy tubercle bacilli, but by imprisoning and incrusting them on the walls of stables they are made harmless by prolonged drying. Whitewashing should be preceded by thorough cleaning.

"Particular attention should be paid to the sides and ceilings of stables. All dust and cobwebs should be periodically washed down. Those parts coming in contact with the heads of cattle, stanchions, halters, troughs, etc., should be frequently cleaned and disinfected, even when they have not been used by diseased cattle.

"The removal of virus from the stables should, furthermore, be promoted by the regular removal of manure and by abundant ventilation. Good air has the effect of diluting infected air, and thereby reducing the chance of inhaling dried, floating tubercle bacilli, or at least of reducing the number inhaled. It likewise improves the vigor of the confined animals, and hence increases the resistance to infection.

"Cattle should not be placed so that their heads are close together; each animal should have plenty of room (each cow should have at least six hundred cubic feet of air space) and occupy the same place in the stable at all times. These precautions will prevent the nasal, lung, or vaginal discharges from one animal striking the head or soiling the feed of another. It is true that it is impossible to prevent animals licking each other outside of the stable, but it should be remembered

that prevention must begin with the removal of all cases which are suspected of discharging tubercle bacilli. Stables should, furthermore, be carefully protected from the expectorations of human beings affected with tuberculosis of the lungs.

"Cattle should be housed as little as possible. The pasture has the effect of greatly reducing the chances of infection by a more or less rapid destruction of the virus, as well as by increasing the vigor of the animals through muscular exertion in fresh air. To what extent animals may pick up the virus on fields, it would be difficult to estimate. That it is perfectly possible cannot be gainsaid. A tuberculous animal may soil the ground over which it passes, and other animals may take up the virus with the food soon after.

"It is not likely that the virus remains alive long enough on the ground to become dried and ready for inhalation. The action of sunlight, the alternate wetting and drying which goes on in nature, may be looked upon as destructive agents. Even if the tubercle bacilli became speedily dried, the great diluting effect of the open air would reduce to a minimum the chances of inhaling the virus.

"Among the other dangers deserving attention is the infection of food and water. Drinking troughs should be so arranged that the surface water is constantly flowing away. Discharges from the nose or mouth left floating on the surface may be drawn in by healthy cattle while drinking. Each person must in such cases use his own judgment and ingenuity to prevent infection, in accordance with the quantity of water at his disposal.

"To restrict the dissemination of the disease among young stock, the safest plan is to bring skimmed milk and other dairy products to the boiling point before feeding them. If the cows are positively known to be healthy, this may be unnecessary, but where any doubt exists the heating should be resorted to.

Such a precaution will, furthermore, reduce scouring among calves, which is probably due in a great measure to bacteria in the food.

"In presenting the foregoing suggestions the writer has endeavored to keep in view two conditions: (1) That in which tuberculin is not within reach and only unusual watchfulness can be exercised in separating suspected animals from the healthy, and (2) that in which tuberculin is tried, but with a view that it is not wholly infallible and requires to be seconded with other precautionary measures. If tuberculin is infallible, most of the suggestions made fall to the ground as unnecessary, unless the disease can be readily introduced by men or diseased animals of other species, a possibility of wholly unknown dimensions at present."

We will only add to these valuable instructions that tuberculin is a substance invented by Prof. Robert Koch for the purpose of diagnosing tuberculous diseases. It is a fluid made from cultures of the germs of tuberculosis, but it does not contain either dead or living germs of tuberculosis, because it has been sterilized by heating, thus killing the germs; and filtered through porcelain, so that after they are destroyed they are completely removed from the fluid.

By *tuberculin test* is understood the process by which tuberculin is applied to an animal for the purpose of determining whether it is free from, or afflicted with, tuberculosis. In making the test it is necessary to determine the normal temperature of the animal, and then inject a small quantity of the tuberculin. If the animal has tuberculosis, its temperature will rise within from eight to sixteen hours after the injection, but if it does not suffer from tuberculosis, the temperature is not influenced.

The tuberculin test should always be applied by a competent veterinarian, and no danger will arise to the animals,

for, when properly applied, the healthy animal is never affected thereby.

Of course, there are conditions in animals, as there are in man, which predispose to the disease. The breed as well as the conditions under which an animal is compelled to live determine its susceptibility. We believe it to be perfectly safe to say that the suggestions made regarding the prevention of tuberculosis in man are also applicable to animals. Light, air, cleanliness, proper food, and sufficient exercise are essential in combating tuberculosis in the bovine race. After a herd has been freed from its tuberculous members and a strict hygiene has been instituted, with plenty of room for every animal, there will be little danger of a new outbreak of the disease.

Of course, as already mentioned in Dr. Smith's instructions, it is essential that no consumptive, no matter in what stage of the disease, should be permitted to enter these stables. To have cows attended to by tuberculous help is absolutely dangerous. Expectorating on the floor of a stable should be as strictly prohibited as in the dwelling of man. If there is any disease such as diarrhœa, fever, etc., about the dairy or farm the physician should be called in. Medical advice should also be sought in cases of slowly healing ulcers and sores. Scrupulous cleanliness in the handling of milk and butter in dairies is, of course, essential and all the vessels used should be thoroughly cleaned with hot water before being used again.

Tuberculosis among swine is not so rare as is usually assumed. While the disease among cows may not always be recognized by the loss of fat and general bad appearance (for even tuberculous cattle can be fatted), in swine tuberculosis manifests itself at a very early date by a marked emaciation. Very often these swine are then quickly slaughtered and the meat made into sausages. That through such procedure the health of the consumers is endangered is evident, especially

when one considers that many kinds of sausages are eaten without being cooked. Tuberculosis among young swine manifests itself most frequently in the form of intestinal troubles. The main symptoms of the disease are the loss of flesh and bad appearance already mentioned, a pale mucous membrane —that is to say, the inner lining of the mouth loses its reddish color—a marked diarrhœa, flatulency and discharge of gases. If there is tuberculosis of the lungs, cough and vomiting are additional symptoms. In both forms of tuberculosis a swelling of the glands around the neck is often observed. When these animals are slaughtered, one can see little tubercles or elevations and ulcerations along the inner wall of the gut, and on the surface of the lungs. As soon as the disease is discovered among the animals, the sick swine should be separated from the healthy ones. A veterinarian should then be consulted, who will give directions for the destruction of the tuberculous meat and the disinfection of the sties.

The prevention of tuberculosis among swine is not so difficult when one thinks of the causes of the disease. A sucking pig can be infected by a tuberculous sow. The most frequent source of tuberculosis among hogs, however, comes from feeding them on skimmed milk and other dairy products from tuberculous cows A few cases are also known where hogs became tuberculous from eating the expectoration of consumptives.

Tuberculosis of horses is rare and difficult for a layman to recognize. When a horse with a seemingly good appetite has a bad appearance and loses flesh, tires easily, and is short of breath, one should think of tuberculosis. Much urinating and a high temperature (fever) are additional symptoms of tuberculosis in horses. When such conditions are discovered, it is, of course, self-evident that the animal should be isolated until the veterinarian arrives.

Tuberculosis among goats is extremely rare. In the few cases which have been recorded the origin of the disease could be traced to the ingestion of milk from tuberculous cows. Dogs take the disease when living with consumptive people, and the infection probably takes place through ingesting and inhaling infectious substances.

CHAPTER XVII.

WHAT ARE THE OCCUPATIONS IN WHICH TUBERCULOUS INVALIDS, EVEN IN THE FIRST STAGES OF THE DISEASE, SHOULD NOT BE EMPLOYED?

There are certain occupations, especially those that require a long sojourn in the open air every day without too much bodily exertion, which tuberculous invalids in the first stages of the disease may be permitted to follow in their own interest as well as in that of their fellow-men. There are, on the other hand, certain occupations which should never be permitted to consumptives. What we have said in the preceding chapter concerning tuberculous help about cow stables and the possibility of their propagating the disease, is, of course, also applicable to milk dealers, butchers, cooks, bakers, confectioners, and all who have to do with the preparation or sale of food substances. For bread to be handled by tuberculous bakers or bread dealers is dangerous. The possibility of infection is evident when one considers through how many hands the bread passes before it enters the mouths of the consumers, and that, probably, nobody ever thinks of cleaning the bread before eating it. A very recommendable practice is now in vogue in some of the large bakeries in connection with the handling and transporting of bread. The moment the bread comes out of the oven, while it is still too hot to be handled, it is placed, by the aid of a shovel, upon a piece of wrapping-paper large

enough to envelop the whole loaf. By twisting the two ends of the wrapper the bread is completely enclosed.

The most scrupulous cleanliness should be practiced wherever articles of food are handled or exposed for sale. We have already mentioned in Chapters XIII and XIV that certain occupations, such as those of stone-cutters, printers, and cigar-makers, render weak individuals particularly prone to consumption; therefore, any one inclined to this disease should, in his own interest, never pursue such an occupation.

Lastly, we must mention one more occupation in which tuberculous individuals should never engage, namely, that of keepers of animals in menageries. Large animals, such as lions and tigers, also the larger and smaller classes of apes, are subject to tuberculosis when in captivity. There is no doubt that an ape-house, visited by thousands of people, old and young, every day, must be considered dangerous and capable of propagating the germs of tuberculosis among the visitors if some of the animals should be tuberculous.

CHAPTER XVIII.

WHAT ARE THE MAIN SIGNS AND SYMPTOMS OF THE BEGINNING OF TUBERCULOSIS OF THE LUNGS OR CONSUMPTION?

These symptoms are often so obscure and show themselves so gradually that they are frequently overlooked by the patient as well as by his friends. Since, however, the cure of the patient depends upon the early discovery of the disease and a timely treatment, we will here describe such symptoms as may be recognized by the layman.

The man, woman, or child with a hereditary predisposition to consumption often has a narrow chest and stooping shoulders. While a slow, gradual emaciation and loss of weight may at times be observed, this is by no means a rule.

One occasionally sees tuberculous patients who present a relatively good appearance during the first stage of the disease. Paleness of the skin, at times with bright red cheeks, is, however, a rather common early sign. A marked inclination to frequent catarrh is often present, and the character and disposition of the individual may change when the disease comes to an outbreak. There is a dislike to work, also to the pleasures and occupations which the invalid formerly loved to pursue. He will probably also complain of getting tired easily. In the afternoon hours he will have a light fever, and a hacking cough in the morning or evening. Dyspepsia and loss of appetite, palpitation of the heart and pains in the chest, are also symptoms of importance. Of course, some or several of these signs and symptoms may also be the indication of the approach of other diseases than tuberculosis of the lungs. The presence of such symptoms should, however, serve to all, whether predisposed to tuberculosis or not, as a warning to seek medical advice. Especially persons who cough more or less continually should submit themselves to a thorough examination. The science of medicine has made such progress that the recognition of a beginning tuberculosis of the lungs no longer presents any difficulty; therefore, whenever there is a suspicion of the beginning of consumption, the calling in of a physician may assure cure and restoration to health, and if no tuberculosis is present the medical examination will quiet unnecessary fears.

CHAPTER XIX.

WHAT ARE THE EARLY SYMPTOMS OF OTHER FORMS OF TUBERCULOSIS?

In case of tuberculosis of the throat, the general symptoms are about the same as those just described for the beginning of consumption of the lungs; but in addition there will be a

certain hoarseness and roughness of the voice. Pain in swallowing very hot and cold liquids or hard food may also sometimes be observed in the early stages of this disease.

The early symptoms of tuberculosis of the bones and joints manifest themselves in lameness and easy tiring of the arm or leg affected. A light pressure in the region of the joints causes a sudden severe pain. If the spinal column is affected, the symptoms will depend upon the location of the vertebra which is attacked by the disease. For example, if this should be in the region of the neck, there will be difficulty in swallowing, in breathing, or a frequent dry cough. If any one of the vertebra in the region of the chest is affected, a feeling of constriction like a tight band around the chest will be observed, accompanied often by digestive troubles. If the seat of the disease is the lower portion of the spinal column, there will be irritation of the bladder and lower bowels, an inclination to much urinating, and radiating pains toward the hips.

It is, of course, self-understood that when any of these symptoms are discovered the physician should be called in, for only through the most careful treatment can a patient be saved from a lasting deformity.

The bone-and-joint tuberculosis is most frequent during childhood. The same may be said of that form of tuberculosis which is known as scrofula, and which might be considered almost exclusively a disease of children. The scrofulous child is usually pale, with flabby skin and muscles. The glands around the neck are swollen, and skin disease, sore eyes, and running ears are frequent symptoms. The little patient usually manifests a phlegmatic condition, but we may also find some that are nervous and irritable. The latter often have a particularly white, delicate skin, which makes the veins visible. Fever may be observed in some children. In view of the happily very curable nature of scrofulous affections, the importance of the

early recognition and of the timely and judicious treatment is, of course, self-evident.

CHAPTER XX.

HOW CAN CHILDREN BE PROTECTED FROM SCROFULA AND OTHER FORMS OF TUBERCULOSIS?

Scrofula may be either hereditary or acquired. The hereditary type comes from parents who are scrofulous, tuberculous, or syphilitic. It has also been proved that when one or both of the parents were alcoholics, that is to say, addicted to the chronic use of intoxicants, their offspring has become scrofulous.

All this shows how dangerous it is for weakly and sickly persons, or those afflicted with any of the above enumerated diseases, to marry and have children before being completely restored to health. We wish to state again that all these diseases can be cured by timely medical treatment. To be cured from alcoholism the physician's help is not always necessary; in most cases it requires only the earnest and honest endeavor to abstain.

The causes of acquired scrofula in children are to be sought in unhygienic environments and conditions, such as unhealthy dwellings, damp, crowded, unclean, and badly ventilated rooms, much indoor life, underfeeding, exposure, and colds brought about by insufficient clothing and lack of care. In fact, one may say the same conditions which produce favorable soil for the invasion of the germs of consumption in the adult are conducive to the development of scrofula in children. How these conditions are to be overcome we have endeavored to explain in Chapters XII, XIV, and XV, and we will speak of them in their sociological aspect in Chapter XXVIII.

In Chapter XII we stated that it is extremely rare for tuberculosis to be directly transmitted, and that in children the contagion nearly always takes place while they are very young. We will now explain the various ways in which a healthy child may become tuberculous, and learn therefrom how to protect it from the danger of getting the disease, either by inhalation, ingestion, or inoculation.

The most common modes of infection during early childhood are perhaps the following: The consumptive mother caresses the child and kisses it on the mouth; she prepares the food, tasting it to judge its temperature and flavor through the same rubber nipple or with the same spoon the child uses, and thus unconsciously conveys the germs of her disease from her own mouth to that of the child. Later on the child will play on the floor of the room, and should there be a consumptive in the family who from carelessness or ignorance is not prudent in the disposal of his expectoration, the child is indeed likely to be infected. The little one, while playing on the floor, may with great facility inhale the bacilli floating with the dust in the air, and can thus acquire tuberculosis by inhalation, the full development of which may only take place in later years, when the origin will not be thought of. Again, the little child touches everything it can take hold of, infecting its fingers thoroughly, and by putting them in its mouth tuberculosis by ingestion may result and gradually develop into consumption of the bowels. Lastly, should the child's nails be neglected, it may scratch itself with the infected fingers, and thus inoculate its system with the disease. Tuberculosis of the skin, or lupus, may result from such an unfortunate accident.

To prevent these infections during childhood is certainly possible by taking the following precautions: Not only should consumptives be religiously careful with their expectoration, *but* they should associate as little as possible with young chil-

dren, and stay away from playrooms and playgrounds. We repeat that to kiss children on the mouth should never be allowed, and the little ones should be taught never to kiss nor be kissed by strangers. They should be kissed by their own friends and relatives as little as possible, and then only on the cheeks. The floor on which the child plays should be kept scrupulously clean. Carpets in such a place are an abomination; they only serve as dust and dirt collectors, and not infrequently harbor the germs of contagious diseases. The hands and nails of little children should be kept as clean as possible.

Expectorating on playgrounds should be considered a grave offense and should be punished accordingly. These playgrounds should be kept clean, as free from dust as possible, and daily strewn with clean sand or gravel.

CHAPTER XXI.

CAN TUBERCULOSIS, ESPECIALLY IN ITS PULMONARY FORM, OR CONSUMPTION OF THE LUNGS, BE CURED?

This question can be answered with a very decided Yes. Of eminent men of the past and present, who in their youth or early manhood were declared to be consumptive, but who attained, nevertheless, a more or less advanced age, may be mentioned the German poet Goethe, Napoleon the First, and our own Peter Cooper. Dr. Hermann Brehmer, one of the foremost German physicians, was a consumptive when he started the first sanatorium for tuberculous patients in 1859, over which he presided for more than thirty years with great success. His most celebrated pupil, Dr. Dettweiler, entered his sanatorium as a consumptive, became Brehmer's assistant, and has been for twenty-five years active as the medical director of the Falkenstein Sanatorium. The late Dr. Pean, of Paris, who died at the age of sixty-five, was declared phthis-

ical when twenty. Francois Coppee, one of the greatest poets of modern France, takes delight in telling that more than twenty years ago a life insurance company refused to insure him, because he was declared consumptive, and how badly the company ought to feel now, having lost his premiums for over twenty years. There are thousands of cases where people, once declared consumptive by competent physicians, have ultimately recovered, and pursued their vocations in life with unimpaired vigor for many years afterward.

The statistics from sanatoria for consumptives, where patients in all stages of the disease are received, show that twenty-five per cent. leave as absolutely cured, and forty to fifty per cent. leave much improved, many of them being again capable of earning their living In institutions where only patients in the early stages of the disease are received, as many as seventy to seventy-five per cent. have been cured.

CHAPTER XXII.

HAVE THE FORMER PATIENTS WHO LEFT SANATORIA OR SPECIAL INSTITUTIONS FOR THE TREATMENT OF CONSUMPTION AS CURED, REMAINED LASTINGLY SO?

That a lasting cure of consumption is possible we have shown in the preceding chapter by enumerating the names of some great men who were consumptive in their youth, but were cured and lived a long and useful life, some even attaining a ripe old age.

Concerning the duration of cures accomplished in sanatoria and special hospitals for consumptives, we will reproduce some of the statistics published in recent years. Among 99 patients discharged from the Falkenstein Sanatorium as cured, 72 were well at the time the inquiry was made, which was three to nine years after the patients had left the sana-

torium. In 15 cases a relapse had occurred, but 12 of these patients had improved again; 12 of the 99 had died. Dr. Wolff's inquiries concerning 95 patients discharged as cured from Brehmer's institution in Goerbersdorf, resulted in the following: 5 were alive and well after a period of from 21 to 29 years; 52 were well after a period of from 12 to 21 years; and 38 were well after a period of from 7 to 12 years. Dr. Hauffe, of the St. Blasien Sanatorium in Germany, wrote in 1891 to 324 former patients who had left the institution between 1879 and 1889. Forty-six did not reply, 5 were reported dead, 12 had grown worse, 201 thought themselves still relatively cured, and 72 were absolutely cured. Dr. von Ruck of Asheville, N. C., reported to the author of this essay that he had written to 650 of his former patients who had left the sanatorium from one to three years before; 457 responded, directly or through friends. Of these, 67 felt absolutely cured; 70 felt relativly cured; 258 felt still improved; 62 got worse or had died. Dr. E. R. Baldwin, of Saranac Lake, N. Y., reported recently that at the Adirondack Cottage Sanatorium they were in constant correspondence with 115 patients who had been discharged within the last ten or twelve years, and while a few had relapsed slightly, the majority were well at their homes. Of course, these reports do not, and cannot, correspond exactly. With the exception of the last-named institution (Adirondack Cottage Sanatorium), which only takes patients in the earlier stages, those sanatoria receive patients for treatment in all stages of the disease. But, as a whole, these statistics are certainly encouraging, and the question "Can consumption be lastingly cured?" may also be answered with a decided Yes.

Not only the living but even the dead give us absolute proof of the curability of tuberculosis of the lungs. In the autopsies (post-mortem examinations) of many individuals

who have died of other diseases than consumption, healed scars are found in the lungs, giving the visible evidence of a healed tuberculosis. Statistics concerning this occurrence show that the number of cases of healed tuberculosis of the lungs, discovered at autopsies, is nearly twenty-five per cent.

Other forms of tuberculosis are also curable, particularly the forms which manifest themselves as scrofula, or diseases of the bones or joints in children. The results which have been obtained in sea-coast sanatoria and special hospitals, of which a number exist in France, Germany, Holland and Italy, are well-nigh surprising. According to a recent report of the general secretary of the Society for the Creation of Sea-Coast Sanatoria for Scrofulous and Tuberculous Children in Germany, no less than fifty per cent. of these little ones leave those institutions perfectly cured.

We do not think it an exaggeration to say that of all chronic diseases tuberculosis is the most curable, and of late years the most frequently cured. After these glad tidings concerning the curability of tuberculosis in general, and particularly of the once so very much feared tuberculosis of the lungs or consumption, let us ask *how* consumption is treated and cured.

CHAPTER XXIII.

WHAT ARE THE MODERN METHODS TO TREAT AND CURE CONSUMPTION?

It is not cured by quacks, by patent medicines, nostrums, or other secret remedies, but solely and exclusively by scientific and judicious use of fresh air, sunshine, water, abundant and good food (milk, eggs, meat, vegetables, fruit), and the help of certain medicinal substances when the just-mentioned hygienic and dietetic means do not suffice in themselves to combat the disease.

The thorough and constant supervision of the pulmonary invalid, the immediate intervention when new symptoms manifest themselves or old ones become aggravated or do not disappear rapidly enough, the prescribing of proper food and drink, can only be done by the thoroughly trained physician. Therefore, right here let us sound a note of warning; namely, that not the most beautiful climate nor the most delightful resort can cure the consumptive patient if he is not wisely guided in his treatment.

Sometimes this class of patients think that they feel well enough no longer to need to submit themselves to the control of their physician. They think that they may safely pursue pleasures, sometimes even excesses, or take up work just as well as healthy people. Such carelessness on the part of a recovering consumptive has many a time resulted in a serious relapse.

The thorough belief in the curability of pulmonary tuberculosis, and the conviction that the hygienic and dietetic treatment under constant medical supervision could be most successfully carried out in an institution exclusively intended for that purpose, caused Hermann Brehmer, the German physician mentioned above among the illustrious men cured of consumption, to establish the first sanatorium for consumptives, at Goerbersdorf in Silesia (1859); although it must be said, in justice to the English medical world, that special hospitals for consumptives were erected in or near large cities as far back as sixty years ago. These "special hospitals" for consumptives in former years did not differ much from general ones, while a sanatorium for consumptives has many features by which it differs entirely from an hospital. Brehmer, in his day, maintained that such institutions should have particular climatic conditions, and should always be situated at a considerable elevation above the sea in order to obtain satisfactory results.

The experience of more recent years, however, in Europe as well as in the United States, has shown that properly conducted sanatoria or modern special hospitals, erected in regions with no claims for special climatic advantages, obtained just as good results in the end as institutions situated in typical climatic resorts.

To give the layman an idea of what is understood to-day by a closed institution or sanatorium, exclusively intended for the treatment of consumptives, we will answer the following questions:

CHAPTER XXIV.

WHAT IS A MODERN SANATORIUM FOR CONSUMPTIVES? AND CAN SUCH A SANATORIUM BECOME A DANGER TO THE NEIGHBORHOOD?

A modern sanatorium* for the treatment of consumptives is an institution usually situated in a healthy locality, somewhat elevated, relatively free from dust and traffic. Only patients suffering from tuberculosis are received. The greatest care is exercised everywhere, in buildings and surroundings, to avoid the possible transmission of the disease to employees, visitors, or the neighbors of the institution, and equally great care is exercised to prevent a reinfection of the patients themselves. All the precautions enumerated in Chapters IV and V, which provide for the destruction of the infectious expectora-

*The word sanatorium is used in this essay in preference to the word "sanitarium" for the following reasons: Brehmer, the founder of the first institution of that kind, called it "Heilanstalt," which means a healing institution; and the word "sanatorium," from the Latin sanare, to heal, gives certainly a better equivalent to the German word than the word "sanitarium." This latter word is derived from the Latin sanitas, health, and is usually employed in this country to designate a place considered as especially healthy, a favorite resort for convalescent patients, or an institution for the treatment of mental or nervous diseases.

tion, are carried out with the utmost rigor in the sanatorium. A voluntary violation of rules, relating to the disposal of the expectoration, is followed by immediate dismissal of the offender.

The hygienic and preventive measures in these modern sanatoria are so thorough that it may be said one is in less danger of becoming infected with the germs of consumption there than anywhere else. It is of the rarest occurrence that any of the physicians, nurses, or employees in such an institution contract tuberculosis. It seems to us that this is a very good proof of how easily infection can be avoided when physician and patient work together to combat the tubercle bacillus, this great foe of mankind.

Another very interesting observation is that in localities where sanatoria for consumptives are situated, the mortality from consumption among the inhabitants of the respective villages has markedly decreased since the establishment of the institution. The splendid hygienic and preventive measures instituted in the sanatoria have been voluntarily imitated by the villagers, and as a result the mortality from pulmonary tuberculosis among the inhabitants has gradually decreased. Thus we are glad to be able to answer in the negative the question so important in the combat of tuberculosis as a disease of the masses, "Are sanatoria for consumptives a danger to the neighborhood?" From well-conducted sanatoria for consumptives no danger can arise to the surroundings. To confirm this statement by exact statistics, we will reproduce the data taken from the official documents of the two villages, Goerbersdorf and Falkenstein, where five of the largest German sanatoria have been located for many years.

In Goerbersdorf the deaths from consumption were:

1790-1799	14
1800-1809	5
1810-1819	9
1820-1829	9
1830-1839	8
1840-1849	6
1850-1859	7
1860-1869	4
1870-1879	5
1880-1889	5

The sanatorium in Goerbersdorf was established in 1859, and since then the population of the village of Goerbersdorf has doubled.

In the village of Falkenstein died from tuberculosis:

Before the Establishment of the Sanatorium.

1856-1858	17.2 per 100
1859-1861	7.7 "
1862-1864	22.6 "
1865-1867	14.0 "
1868-1870	16.7 "
1871-1873	21.0 "
1874-1876	33.3 "

After the Establishment of the Sanatorium.

1877-1879	17.0 per 100
1880-1882	14.6 "
1883-1885	6.0 "
1886-1888	5.0 "
1889-1891	13.9 "
1892-1894	15.1 "

The patients in such a sanatorium live, so to speak, day and night in the open air. During the day they lie on lounging chairs on the open veranda and take walking and breathing exercises, and at night they sleep, of course, with the windows open. It is surprising how easily consumptives get accustomed to the prolonged sojourn in the open air. Neither change of weather, cold, rain, snow, nor even wind, providing it is not too strong, hinders the patients from spending most of their time on the piazza, porch, or rest-cure gallery. Observations made by the house physicians in sanatoria prove that the change of weather has little influence on the trained consumptive patient, and that the rest cure on the galleries of the sanatorium can be successfully carried out in winter or summer, rain or shine. When it is very cold patients cover themselves a little more with blankets or furs. Dr. Andvord, of the Tonsaasen Sanatorium, reported that his patients remained in the open air from five to nine hours a day at a temperature of 13° F. below zero, and felt quite well. Similar reports come to us from that excellent American institution, the Adirondack Cottage Sanatorium, under the direction of Dr. Edward L. Trudeau, the pioneer of the sanatorium treatment in the United States. We reproduce a photograph (Fig. 19) taken on a winter day at that institution, showing how well and comfortable the patients are in spite of the cold. We also give a typical German rest-cure gallery or "Liegehalle" (Fig. 20), and finally a picture representing the rest cure in summer in the woods at a sanatorium in the Black Forest in Germany (Fig. 21). The latter shows how the patients in a sanatorium know how to have a good time. One must not think these institutions dreary and cheerless places. The majority of the patients do well, as a rule, and progress favorably toward recovery. As a consequence they feel happy and

FIG. 19.—Rest Cure in Winter. Adirondack Cottage Sanatorium.

impart their joy and good humor to the rest, thus helping to keep all the patients in good cheer.

The discipline in these institutions deserves by no means to be considered an objectionable feature. Discipline in a sanatorium for consumptives is as essential in the interest of the patients as for everybody else. The rules and regulations of the institution are for the common good. The physicians

FIG. 20.—A German Rest-Cure Gallery.

and nurses have, as a rule, the patience, forbearance, and devotion which their calling requires; but when it is necessary in the interest of the patients and their environments, the physician must have the right to make his authority felt. A sanatorium should not only be a place where a patient becomes cured, but also a place where he should learn some lessons for the future. All that he will have learned from the rules and regulations, and the advice of the physician concerning how to protect himself and others from contracting the disease, how

not to take cold, and how not to lose what he has gained, are precious lessons which he will take home with him.

The physician of the consumptive, whether in a sanatorium or at home, must be the friend of the patient, and have his unlimited confidence. In all such questions as marriage, sexual relations, and childbirth, the physician's advice should be sought. Much unhappiness and family misfortune can often be avoided by asking and conscientiously obeying the physician's advice. One of the main features of sanatorium treatment is ample nutrition, one might even say overfeeding. The principal meals are usually taken in well-ventilated dining-rooms, the lunches on the piazzas or on the rest-cure galleries. Many patients, in order that they may gain more rapidly in weight and strength, receive an additional quantum of fresh milk daily.

On arriving at the institution every patient is carefully examined and weighed by the physician, and this process is repeated at regular intervals during the entire stay of the patient at the sanatorium. The physician in charge or one of his assistants keeps regular office hours for the convenience of the patients. Those who are unable to be up are visited twice a day by one of the physicians of the institution. Specially constructed rooms for the application of cold water, one of the means of treatment, are usually located in the basement, or the apparatus is installed in a neighboring building. A pharmacy, a laboratory, and a room for the treatment of throat diseases usually completes the equipment of a large sanatorium.

To enable the poorer classes to avail themselves of the advantages of institution treatment for consumption, noble-minded men and women, philanthropists, statesmen, and physicians have in recent years been instrumental in creating in many parts of Europe and in some parts of the United States so-called state or people's sanatoria (Volksheilanstalten).

Fig. 21.—Rest Cure in the Woods.

CHAPTER XXV.

WHAT ARE STATE SANATORIA? AND WHAT ARE "VOLKSHEILANSTALTEN" OR PEOPLE'S SANATORIA?

A state sanatorium in the United States means an institution for the exclusive treatment of patients suffering from pulmonary tuberculosis, created by the funds of the state and supported entirely or in part by the state. The first state sanatorium in America was erected a few years ago near Rutland, Mass. In this institution patients pay fifty cents per day. Recently other states, New York, New Jersey, Iowa, Illinois, Maine, etc., have projected the building of similar institutions.

People's sanatoria in the United States are institutions intended for the poor and people in moderate circumstances, erected and maintained by private philanthropy. While in some institutions patients receive medical treatment and board gratuitously, in others they are supposed to pay part of the expense.

People's sanatoria in Germany have a somewhat different meaning. There, the moment an individual enters upon the career of an ordinary laborer or servant, he is obliged to be insured against sickness, accidents, and old age. If he develops tuberculosis, he is immediately sent to one of the many sanatoria of that country. The government authorities, who are at the head of these state insurance companies, have long since learned that by timely treatment in a sanatorium the tuberculous individual is most speedily and lastingly cured, and consequently with the least expense.

Thirty-seven of these government insurance companies have, according to their published figures for 1897, collectively assisted 4,480 consumptives, of whom 4,432 were sent to subsidized sanatoria. Nearly all these state insurance companies

contribute to the funds of such establishments; some have found it to their advantage to erect special sanatoria of their own. For the year 1897 these state insurance societies of Germany invested altogether 1,300,000 marks in sanatoria for consumptives, and in 1898 a fund of between three and four millions was destined for that purpose.

To discuss whether such state invalidity insurance companies are practicable or feasible in this country does not come within the scope of this work. Still less can we enter into a discussion of why private life insurance companies will not insure persons among whose near relatives consumption has occurred, in spite of the evident curability of the disease. While it is most gratifying to note that some states have undertaken to care for their consumptive poor, and while noble men and women have privately undertaken to care for some of those unfortunate sufferers, there is yet a great deal to be done. In view of the great number of consumptives with little or no means in our thickly populated states, it is evident that the existing institutions are like a "drop of relief in an ocean of woe." Thus let us hope that the good work will go on, and that the new century will see the multiple creation of state and people's sanatoria in the United States.

That such special institutions and thorough hygienic measures are well calculated to combat tuberculosis as a disease of the masses, we shall try to prove in the following chapter.

CHAPTER XXVI.

WHAT EVIDENCE EXISTS THAT BY TAKING CARE OF CONSUMPTIVES IN SPECIAL INSTITUTIONS AND BY HYGIENIC MEASURES, TUBERCULOSIS AS A DISEASE OF THE MASSES CAN REALLY BE SUCCESSFULLY COMBATED?

In England there have existed special institutions for the treatment of consumption, that is to say, hospitals and seacoast sanatoria, in relatively large numbers, for over fifty

years. As a result of the maintenance of these institutions and the enforcement of a most excellent general public hygiene, it was possible to reduce the mortality from tuberculosis during the last years in a most surprising manner, and more rapidly than in any other country of the world. According to the following statistics, compiled by Dr. Tatham, the statistical superintendent in the registrar-general's office, the mortality from tuberculosis among the population of England and Wales has been reduced to wellnigh half of that which it was thirty years ago.

The death rate per million of the population of England and Wales from pulmonary tuberculosis was in—

1870	2,410
1875	2,202
1880	1,869
1885	1,770
1890	1,682
1893	1,468
1894	1,385
1895	1,398
1896	1,307

These figures are perhaps the best answer to the question asked at the head of this chapter.

CHAPTER XXVII.

CAN THE TREATMENT OF CONSUMPTION BE CARRIED OUT WITH SATISFACTORY RESULTS OUTSIDE OF AN INSTITUTION?

This question, too, may be answered in the affirmative, for the cure of a consumptive patient is certainly also possible outside of a sanatorium. The conditions essential to success in such a case are that the social position of the patient

and the general environments are such that all the hygienic and dietetic measures, so essential in the modern treatment of consumption, are at the disposal of the physician. The latter, however, though he may be well trained and exceedingly skilful, cannot hope for success unless the patient is obedient and willing to carry out every detail of the treatment.

FIG. 22.—Arrangement for Open-Air Treatment at Home.

We give here an illustration (Fig. 22) of how the patient in his own house may arrange for permanent open-air treatment by building a small addition with galleries and awnings where he can spend the greater part of the day, and where in warmer weather he may sleep at night. Another simple method for carrying out the rest cure in the open air might be accomplished in the following manner: A large beach chair of wicker-work, such as is seen at our fashionable seaside resorts, is procured. After the seat has been removed the

inner walls are lined with padding. A reclining chair is placed with its back in the interior, and the whole arranged so that the patient is protected from the wind and sun. There the

FIG. 23.—Rest Cure at Home.

patient installs himself for the day, with his books and writing material at his side, placed on a little table, on which his meals may also be served. Being light, the whole can be shifted whenever the wind changes and according to the different time of day, so that the invalid's body may be bathed by the rays of the sun, while his head remains in the shade. (Fig. 23.)

Poorer patients, who for financial reasons cannot have such conveniences and who cannot be received in a sanatorium, must be advised to ask the help of a physician, and under his guidance imitate as far as possible and practicable the sanatorium instalment and treatment at home. During the day the lounge or reclining chair should be moved near the open window if there is no porch or balcony. In summer, or on not too cold or windy days in winter, the patient may be placed, warmly wrapped, on his chair on the flat roof, protecting his head from the sun by an umbrella or a small, improvised tent. If there is a yard or garden, a small platform of boards may be arranged for the chair in a spot sheltered from the wind. A plain steamer chair, padded with a quilt or a blanket, will answer the purpose just as well as a costly reclining chair. How to arrange for the cold-water treatment at home, we have already described on page 50.

The hygienic precautions concerning the expectoration must, of course, be carried out in the private home as rigorously as in the institution. Thus, if the patient has an earnest determination to do his duty, confidence in his physician, and the good will of the friends and relatives who live with him, it is possible to make even a modest home temporarily suitable for the sanatorium treatment.

CHAPTER XXVIII.

WHAT CAN PHILANTHROPISTS AND OTHER MEN AND WOMEN OF GOOD WILL DO TO HELP COMBAT TUBERCULOSIS AS A DISEASE OF THE MASSES?

In Chapter XXV we have spoken of the most urgent need of sanatoria for the consumptive poor. These institutions are particularly wanted in large centres of population. In nearly all of our large cities there are thousands of poor consumptives

living without care or treatment in their dark, filthy tenement-houses, and spreading their disease to their kin and neighbors. Perhaps not one of all the great cities of the Union at the present time can offer sufficient hospital facilities for the treatment or isolation of these unfortunate people. A very large percentage of these patients could be cured or restored to health and made breadwinners of their families if they were taken away from their unhygienic surroundings in time and received proper treatment in a sanatorium.

What great good wealth may do in this respect, how much misery and suffering it may alleviate, and how many lives it may thus save, needs hardly any further demonstration.

But, besides the sufferers from pulmonary tuberculosis, there is a large class of sufferers, especially among the children of the poorer classes, who are afflicted with other forms of tuberculous disease, particularly scrofula, and joint and bone tuberculosis. How very prevalent these scrofulous and tuberculous diseases are among children people in general have scarcely an idea. In Berlin, Germany, careful statistics are kept concerning the daily attendance of the children at the public schools. In one of them it was found that out of 125 boys and 132 girls who did not attend school regularly, not less than 114 of the former and 115 of the latter suffered from tuberculous or scrofulous troubles.

We have already spoken on page 86 of the excellent result obtained in the treatment of tuberculous and scrofulous children in the sea-coast sanatoria of France, Germany, Holland, and Italy. The climate at the sea-shore, in addition to good nutrition and cold and warm sea-baths, seems to be particularly favorable for the cure of scrofula and tuberculosis in children. Institutions for this treatment, like sanatoria for consumptive adults, are important factors in combating tuberculosis as a disease of the masses. The creation of such insti-

tutions in our own country cannot be too warmly recommended to those who wish to help suffering little children.

The cure of tuberculosis in its various forms can be accomplished only by a thorough hygienic and dietetic treatment under strict medical supervision, in sanatoria, or, if circumstances permit, at the home of the patient.

The prevention of tuberculosis as a disease of the masses, on the other hand, especially in the form of pulmonary tuberculosis or consumption, must be sought in combating the causes. In ignorance, lack of light, air, and sun, unhealthy tenements, unclean linen, lack of proper or sufficient food, excesses of all kinds, and, above all, in the abuse of alcoholic beverages, must we recognize to-day the most important factors in the propagation of the disease.

To combat the ignorance in regard to hygienic modes of life in general and the hygiene of tuberculosis in particular, among the masses, must be the duty of the educated. Physicians, teachers, employers, and all men and women who have time, means, talent, and inclination, should unite to educate the masses by lectures and the distribution of pamphlets concerning the nature of diseases, particularly tuberculosis. The formation of societies for the prevention of tuberculosis should be encouraged in every state of the Union. The state and municipal governments, boards of health, or other sanitary authorities should not only favor these useful enterprises, but gladly co-operate in order to increase their usefulness.

To give the poor people of large cities more air, light, and sun, it is essential not only to provide for good sanitary dwellings, of which we shall speak in detail in the next chapter, but also to create a number of parks and playgrounds, by public means or private philanthropy, particularly in the more densely populated districts. Such parks and breathing places are justly called the lungs of a great city.

Cleanliness and the beneficent influence of a bath must be practically taught to the ignorant. While it would be desirable that every family should have its own bathroom, it will be some time yet before this ideal condition will be obtained. In the meantime the establishment of a number of public baths, of which we made mention on page 63 in speaking of labor colonies, will be one of the best means to improve the condition of the poor in this respect and render them less liable to disease. As an example of the excellent work of such public baths I give an extract from the report of the New York People's Baths of last year. These baths were erected and are maintained and managed by the Association for Improving the Condition of the Poor: "The People's Baths are located at No. 9 Centre Market Place, New York. They were opened in August, 1891. The building and its equipment have cost about $28,000. It is situated on land for which no ground rent is charged. The city furnishes the water free. The building is constructed of enamelled brick and iron, and contains twenty-six baths, twenty-three of which are spray baths (seventeen for men and six for women). The other three baths are tubs for old women and children. On the second floor are living quarters for the superintendent, and in the basement the steam plant and laundry. The cost of a bath is five cents, which includes a separate piece of soap and a towel. Last year (1899) the baths surpassed all previous records, and have paid their operating expenses. The result of the year's work shows a credit balance of $137.01. The total number of bathers was 120,347, an increase over the previous fiscal year of 4,662. All monthly and daily records of number of bathers were also surpassed. In July there were 17,452 bathers, and on July 22d the number was 1,175.

"The total operating expenses were $5,571.99, and the total receipts $5,709. No more interesting attempt to better the

conditions under which the tenement population live has ever been made than the People's Baths. Their record for the past eight years demonstrates that habits of cleanliness can be instilled into those occupying the very worst quarters of the city. The success of the baths is also largely due to the fact that they have been conducted strictly on a business basis, the patrons feeling that they have given a reasonable equivalent for the services and accommodations extended them."

Of course, these establishments, in order to be truly useful, should be open all the year round, all day and in the evenings, and to men, women and children.

The causes of insufficient and bad nutrition, while they have often to be sought in the economical and social condition of the community, which we cannot discuss here, are just as, and perhaps more, frequently to be found in ignorance and inexperience. To make a good, plain, healthy, and tasty meal with relatively little expense is an art which must be taught to the young wife, leaving the factory or the position in the store to enter upon the duties of a housewife. Here is a field for noble-minded and experienced women who have made the art of cooking a study. By imparting their experience to their less fortunate sisters, they will make a new household lastingly happy.

Of course, the establishment of public eating houses, where especially the unmarried people of the working classes can obtain good and plain meals for a nominal price, is also a necessity. In connection with the subject of malnutrition, we wish to say one more word concerning poor school-children, especially in large cities. The majority of them very rarely go home for luncheon, and the provisions they bring along from home are often of the most meagre kind. In some cities of Germany the experiment has been made to provide these poor children with a lunch of good meat sandwiches and a glass

of milk. The result of this most praiseworthy work among children badly fed at home has been simply surprising. Nearly all of them gained in weight within a month's time, and all of them were certainly made happier and capable of doing better work at school.

Now one more word concerning alcoholism or drunkenness. There is no doubt that alcoholism must be considered the greatest enemy of the welfare of the nation, the most frequent destroyer of family happiness, the ruination of mind, body, and soul, and certainly the most active co-operator of the deadly tubercle bacillus or germ of tuberculosis (consumption).

To combat alcoholism (drunkenness or intemperance) requires above all education. Extreme prosecution and fanatical laws will do little good. From early childhood the dangers of intemperance and its fearful consequences should be taught. In schools and at home the drunkard should be pictured as the most unhappy of all mortals. While the very moderate use of feebly alcoholic drinks, such as light beers, may be considered as harmless to adults when taken with their meals, alcohol should never be given to children even in the smallest quantities.

In families in which there is a fear of hereditary transmission of the desire for strong drink, even the mildest alcoholic drinks should be absolutely avoided. It would also be best if all people so predisposed, or who may have acquired only the occasional desire for drink, should never smoke, for experience has taught that attacks of dipsomania (periodical sprees) are often caused by an excessive use of tobacco. The young man starting out in life should take with him the moral training which will enable him to be a gentleman, and be considered a polite gentleman, though he absolutely refuses ever to enter a liquor saloon in order to treat or be treated to drink. It is

this treating habit—alas! so prevalent in our American society —which has ruined many a young man and made him a moral and physical wreck. The creation of tea and coffee houses, where warm, non-alcoholic drinks including boullon are sold in winter and cool ones in summer, are to be encouraged. It would be of additional advantage if some of these houses could also offer healthful amusements for old and young. Temperance societies, which through intelligent propaganda help to combat the fearful evil of alcoholism, should receive encouragement from everybody.

CHAPTER XXIX.

HOW MIGHT THE TUBERCULOSIS PROBLEM IN THE UNITED STATES BE SOLVED BY JUDICIOUS LEGISLATION AND A COMBINATION OF PUBLIC AND PRIVATE PHILANTHROPY?

Presuming that there were in all the states sufficient regulations against the spread of tuberculosis from man to man, and that the laws against the propagation of tuberculosis by animals were uniform throughout the United States and enforced in the best possible manner, we would, for further work, suggest the following plan, more particularly for the larger centres of population:

Just as there exists in nearly all states or municipalities a commission or a number of special examiners for the purpose of determining who is a proper subject for state care in an asylum for the insane, so should there exist a commission for the determination of admission to a municipal or state institution for consumptives. Such a commission, composed of a certain number of general practitioners and health officers, should be aided in its work by the charity organizations. Each case should be investigated by a combined committee of physicians and laymen, for the following purposes:

1. To determine the applicant's condition by a medical examination.

2. To visit his home if he has been found tuberculous, and to institute such hygienic measures as seem necessary (distribution of pocket spittoons, disinfectants, etc., gratuitously if the patient is poor).

3. To examine the other members of the family, in order to find out if any of them have also contracted the disease, and, if so, to counsel proper treatment.

4. To report in full to the sanitary authorities concerning the condition of the patient's dwelling. Its renovation or even destruction may be imperative when it is evident that tuberculosis has become "endemic" there, owing to the condition of the soil or to other sanitary defects.

5. To determine the financial condition, whether the patient is or is not able to pay, and whether or not by his being taken to an institution the family will become destitute.

If the latter should be the case, it would be necessary for the municipality to provide for the family. In many cases a letter of inquiry, sent to the former medical attendant of the patient, would materially aid the work of the investigation committee.

Any individual should have the right to present himself for examination, and every physician should be at liberty to recommend any person for examination to the board of his precinct or district.

The institutions needed to carry out this plan would be:

1. A centrally located reception hospital and dispensary. The dispensary should treat the ambulant tuberculous patients, whose admission into the sanatorium is impracticable or has to be delayed for want of room. These dispensaries should also serve the patient discharged from the sanatorium as a place to

seek counsel, and thus aid in his continued improvement and guard against the possibility of a relapse.

2. One or several city sanatoria, located in the outskirts, and if possible in a somewhat elevated region, where the atmosphere is known to be pure. Here all patients should pass through a preparatory sojourn before being sent to the mountain sanatorium. The more advanced cases would all be retained here.

3. One or several mountain sanatoria at no greater distance from the city than from three to five hours by rail, at an altitude, if possible, of between one thousand and two thousand feet, on porous ground, with southern exposure, as nearly as possible protected from the coldest winds by higher mountains, and preferably surrounded by a pine forest. A farm in the vicinity, where the thoroughly convalescent patients could do light work, might make the institution in a measure self-supporting. To this place the selected incipient and the improved cases from the city sanatorium should be sent to complete their cure. To the mountain sanatorium there should also be attached a department for children suffering from pulmonary tuberculosis.

4. Several sea-side sanatoria for the treatment of children afflicted with tuberculous diseases of the joints and other tuberculous (scrofulous) manifestations.

5. A maternity sanatorium where tuberculous mothers should be received a few months previous to their confinement, and surrounded by the best hygienic and dietetic care. They should also remain in the sanatorium for some time after childbirth. It is only by taking away these mothers from their unsanitary tenement homes, and placing them under constant medical supervision in such an institution, some time before and after their confinement, that the fearful mortality among tuberculous mothers after childbirth can be reduced.

The beneficial effect on the woman's and child's constitutions through such an arrangement can hardly be over-estimated. Leaving aside the physical well-being thus largely assured to mother and child at a period when their organisms need the most tender care, the hygienic training which the mother will have received in such an institution will be of lasting utility to herself and child, to the family and to the community.

These maternity sanatoria need not be situated at a great distance from the city. All that would be essential is that they should be erected on good, porous ground, preferably somewhat elevated, and in a locality where the atmosphere is as pure as possible. The buildings should be constructed according to the requirements of modern ways of treating women in childbirth, and with ample facilities for rest cures, sun baths, and the other equipments of a sanatorium for tuberculous invalids.

Another important work toward the solution of the tuberculosis problem which might be accomplished by a combination of public and private philanthropy, in addition to legislative measures, is the multiple creation of model tenement houses, particularly in large centres of population. There should everywhere be legislation to make the erection of any but model tenement houses impossible, and the law should at the same time empower the sanitary authorities to inspect all existing tenements, and if there are any which are unfit or unsafe for human habitation owing to lack of air, light, or ventilation, they should be condemned. As has been said before, if a thorough renovation will not make them sanitary, to tear them down will be the only remedy.

Overcrowding in tenement houses should be considered a crime, and the owner should be held responsible for it. A family of from six to ten living in three rooms, of which per-

haps only one receives direct light and air, cannot possibly remain in a good state of health for any length of time. It is the dreary and cheerless room of the tenement dwelling which often drives the wage earner to the saloon. He finds light and life in the saloon and becomes indifferent to home conditions. Give the workingman a pleasant, clean, healthy, and comfortable home, and the rumshop will have less attraction for him. He will be a better husband, father and citizen. The money formerly spent for liquor will go to the butcher and baker for the better nutrition of his family, and underfeeding (another important agent in preparing the field for tuberculous diseases) will be materially lessened. A very praiseworthy movement in this direction was recently inaugurated in New York by the creation of a tenement-house commission, which has for its purpose the improvement of the housing of the poor by the creation and enforcement of better tenement laws.

Overcrowded prisons, asylums, almshouses, schools, barracks, public homes, lodging houses, etc., must also receive the attention of the sanitary authorities. The often crowded and unclean sailors' boarding houses must not be overlooked. Enough cubic space per individual, more systematic ventilation, and the isolation of tuberculous invalids are the remedies which must be applied.

Ship-builders, ship-owners, and captains should bear in mind that the intensely crowded quarters to which the average sailor is confined during his hours of rest and sleep are absolutely detrimental, and even the outdoor life during the hours of work cannot counteract the deleterious influence which the vitiated air of the forecastle exerts on the health of the seaman. Of course, we are aware that the space given to each individual on board ship must be, necessarily, limited; still there can be some improvement, and the ventilation can be made more perfect. For the very reason that sailors have to

live in crowded quarters the danger of infection on board ship is very great. A tuberculous sailor still at work is almost certain to infect his comrades. But shipboard is not the only place where sailors are exposed to the disease. When on shore they mostly frequent and sleep in houses where the accommodations consist of bunks and straw, and where sanitation is so neglected that they are in still greater danger of contracting disease. To prevent the spread of infection among sailors there is but one remedy, and that is the regular periodic examination of every sailor on board ship and the exclusion from service of individuals suffering from pulmonary tuberculosis.

Lastly, the physicians, statesmen, and philanthropists interested in the solution of the tuberculosis problem have, besides working for the better housing of the poor and the creation of special institutions for the treatment of consumptives, an additional mission to perform. The tide of emigration from village to city should be reversed. If tuberculosis has made its appearance in a family living in a large city, the physician should exert all his influence to induce especially the younger members to migrate to the country and seek outdoor occupations. Statesmen should protect the interests of the farmer, so that farming will have more attraction to the rising generation than it has had in the last few decades; and philanthropists should aid the statesmen by endowing institutions for instruction in scientific and profitable agriculture, and also by providing healthful amusements, good libraries, and other educational institutions in country districts, thus making living outside of large cities more interesting and attractive to young people; in short, the love of nature and life in the open air should be more cultivated. In the proportion in which this is done tuberculosis will decrease.

The creation of schools of forestry in connection with the preservation and cultivation of forests in many states where a wasteful destruction of trees is now carried on, would give useful and healthful employment to a number of people, as well as render the region more healthful. It would offer attractive careers to young men seeking to overcome hereditary or acquired tendencies to tuberculous diseases.

CHAPTER XXX.

CONCLUSIONS.

The author of this essay is aware that much that has been asked in the preceding pages may appear at first too difficult to be realized; nevertheless, he is convinced that by the earnest co-operation of all interested in the solution of the various problems, the task will prove far easier than might be anticipated. In view of the great mortality and fearful ravages of the disease in question, his hopes for a more rigorous crusade against this common foe of all mankind are justified. He is optimistic enough to believe even in an ultimate eradication of the disease.

If any community is visted by an acute contagious disease, smallpox for example, of which a few people may die, everybody is up in arms; while consumption, a far more prevalent disease, demanding thousands of lives every year, is treated wellnigh with indifference. Yet all who have made the disease a study have for years come to the conclusion that tuberculosis, especially in its pulmonary form, is not only a preventable disease, but one which can in the majority of cases be completely and lastingly cured. It is certainly within the

power of man, living in a civilized country, such as the United States, where so much intelligence, wealth, prosperity, and philanthropy prevail, to combat tuberculosis as a disease of the masses most successfully.

All that is required to attain this goal is the combined action of a wise government, well-trained physicians, and an intelligent people.

THE GERMS OF CONSUMPTION.*

By J. H. HUDDLESTON, M. D., New York City.

What Are the Germs?—Ever since 1882 the word "germ" used in this title has meant a very definite thing—a vegetable, not a bug or anything else belonging to the animal world—but a vegetable of a low order—and so small that a single one can be seen only with a powerful microscope. The German physician, Dr. Robert Koch, discovered it and proved that it was the one essential cause of the disease, which in all its forms is known as tuberculosis, and which in some of its forms is popularly known as consumption.

The germ is shaped like a slender, straight or slightly curved rod, and is so short that it would take three thousand of them in line to equal one inch in length. It has other names; it is sometimes called a microbe, sometimes a bacterium, and again a bacillus. It is alive—it grows and multiplies, but it can not move itself. So light is it, however, that it may be carried in the saliva expelled in talking, or in sputum raised in coughing, and when that saliva or sputum is dried to dust it may be blown about in the dust. It may live many months, especially in a dark, damp place, but it is usually killed by ordinary daylight within one week, and by direct

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sunlight it is killed within a few hours. Cold has no effect on it, but it is immediately killed by being boiled, and is even destroyed by a temperature of 140° F. continued for fifteen minutes. Many substances, too, known as disinfectants, kill these germs in a shorter or longer time—minutes or hours. Rarely, if ever, does the germ multiply outside of the body except under laboratory conditions—that is, when it is planted on a special soil, and cared for at a special temperature, as may be done in a laboratory.

Where Are They Found?—They are found in every person or animal affected with tuberculosis, in the parts of the body so affected. Almost every tissue may be the seat of growth of this parasite, but most frequently by far the lungs are affected, though in children what are called the lymph glands and the bones are especially attacked. Millions of germs may exist in a single organ. They are also found, and in this is the danger, wherever the sputum from a lung so diseased has fallen, or wherever that dried sputum has been blown. They are also often found in the milk from a diseased cow, or in the flesh from a diseased animal, or in the laboratory on the special soil on which they are grown. In the laboratory so many may be growing together in a glass that they can be seen as a grayish-white mass.

What Do They Do?—If some are floating in the air as they are apt to do wherever dust in an infected place is stirred up, and one, two or more pass into the nose or mouth with the air breathed in, and if they obtain lodgment in some tissue, and finding the necessary food and temperature there, begin to grow, just as the fungus does on another plant—what happens? In the first place, just as dust getting into the eye irritates it and makes it water—that is, makes the eye react—so these germs irritate the tissue and set up a reaction there, and on the character of this reaction depends the fate of the

person or animal so infected. In every case, some of the cells of the body gather round the germs, and form a little mass or lump there, which is called a tubercle, and these tubercles vary in size from the minutest pin-point to the size of a marble or larger, and if many fuse together they attain almost any size capable of being contained in the organ. Now, around these tubercles there may take place a process ending in healing, or one ending in destruction and death. Just as a wound heals with the formation of a dense, hard scar, so scar material may be formed around and through the tubercles, shutting them in, and this scar may even be turned into stone. When there is a firm enough scar formed, the germs can do no injury, and the person is said to be cured. Again, the irritation may be so great that the tissue becomes inflamed for some distance around the germs; if, for example, the germs are in the lung, a part of the lung may become solid just as it does in pneumonia. While the germs are multiplying they form a poison which is itself an irritant, and which, being absorbed, causes the fever and certain other of the symptoms of tuberculosis. When these tubercles and tubercular masses attain some size, they usually die at their centers, and if there is an opportunity, as when there is an air tube leading from them to the open air, this dead matter may be coughed up, forming part of the sputum of consumptives.

No dust causes consumption unless it contains this particular germ, but wherever a consumptive has not been careful of his sputum, and has allowed it to mingle with the dust, that dust has become infectious. There are many sorts of germs in all ordinary dust besides the germs of consumption, and some of these other germs, when breathed in, may grow in this same dead tubercular matter, make it break down faster, and help in blood poisoning. It is therefore one of the benefits of pure air that the person breathing it does not have to fight these

other germs. When this dead matter is coughed out, a hole is left behind, and the cavities in the lungs which many consumptives have are thus begun. This dead matter regularly contains the germs of consumption, sometimes in very large numbers. The actual number in a measured amount has been counted in some cases under a microscope, and by this count, with a knowledge of the amount of sputum the consumptive has raised, it has been proved that as many as four thousand million germs have been expectorated in twenty-four hours.

While the tubercles are increasing in size, some of the germs may get into a blood-vessel and be carried off with the blood and deposited in another organ. One or more organs at a distance may thus be infected, and if the number of germs so scattered is large, there may be tubercles found all over the body—a rapidly fatal condition.

How Do They Enter the Body?—It is possible for the germs of tuberculosis to get into the body in several distinct ways; first, they may be swallowed in food, as in tuberculous milk or meat or in the milk taken by an infant from the unclean nipple of a consumptive mother.

Unless the greatest cleanliness is habitual, the hands of a consumptive are often contaminated with saliva or sputum, and infect food, books, papers, and other things; when these infected articles are handled by others, some of the germs on them may be carried to the mouth and swallowed. The moustache and beard of a consumptive can be kept clear of germs only by constant care, and if they are not clean, they may infect napkins and handkerchiefs. Kissing a consumptive may also permit the germs to be transferred to another. When the germs are taken into the mouth they may be swallowed and pass through the entire digestive tract and be evacuated without doing harm, or, on the other hand, they may come to

rest and cause infection at any point in the tract—though oftenest in the tonsils and in the intestines.

In the second place, and more rarely, germs enter through cuts in the skin when one is handling tuberculous material, like the handkerchief or sputum jar of a consumptive; and third, most rarely of all, they may be given to the unborn child by the mother.

Practically, however, these germs in the majority of cases enter in the fourth way, as infected dust breathed in by the person. In this case they may infect first the larynx, or voice box, or the large or small air tubes, or the lungs themselves. In every city there is a large number of careless consumptives, who allow their undisinfected sputum to mingle with the dust wherever they are. These people are dangerous; careful consumptives are not dangerous, but the careless ones infect their surroundings indoors and on the streets.

What Protects Against Inhaled Dust?—Inasmuch as Dr. Prudden has shown that a person living in New York City breathes into his lungs in the course of a minute a number of bacteria varying from ten to four hundred according to the place where he is, it is worth while to consider what protection he has against these. Some of them, it should be said, are harmless; others might cause disease, and in the number there may be some of the germs of consumption.

There are, roughly speaking, four lines of defense. In the first place, a great many bacteria are caught in the nose or throat by the mucus, and are blown out or spat out or swallowed. These, therefore, do not enter the lungs. In the next place, the material, which starts down into the lungs along the windpipe and smaller air-tubes, and comes to rest on the walls of the tubes, is swept out by the very minute projecting hairs called cilia, which line the walls, and constantly move in

such a manner that whatever is on them is driven away from the lungs up to the outer air.

There is a third protection in the existence in the body of certain cells which travel about and gather up waste material and carry it off to deposit it in a safe place or to digest and destroy it. Some of these cells imprison the germs and carry them away in the same way. Finally, if some of the germs do get into the smallest air spaces of the lungs and pass through their walls, they are taken up by a nutrient fluid called the lymph, which circulates all through the body, and carried to the fourth defense—certain glands which are placed at the roots of the lungs as well as at other points in the body, and which act as filters. By these the germs are caught out of the stream and prevented from going to the rest of the body.

THE OUTDOOR TREATMENT OF TUBERCULOSIS.*

By DAY ALLEN WILLEY.

It was a little over twenty years ago that Koch discovered the minute form of life which has been called the bacillus of tuberculosis—a proof that consumption is infectious. What the eminent savant detected beneath the microscope resulted in a radical change in the method of treating this disease. As medical men have studied the various methods, the benefit which nature could confer in eradicating it has been more and more appreciated, until the time seems to have come when medicine may be considered but an incidental in successful treatment.

It may be an exaggerated prediction to make, but twenty years hence may see the man or woman whom the physician has diagnosed as suffering from lung trouble starting for the health camp in the vicinity of his or her abode, to return a few weeks or a few months later restored to health, and able to again take up life's pursuits—an era when some of the hospitals which have been constructed and equipped purposely to care for pulmonary patients will be needless, and consumption in its advanced stage almost as rare as smallpox or yellow fever; yet, judging by the results which have thus far been attained, there is a possibility of this state of affairs coming to pass, and not far in the future. The fact is, that out in the

*Reprinted, with the permission of author and publisher, from the Review of Reviews for June, 1903.

Patients Taking a Sun-Bath in Winter in Massachusetts.

open, even amid snow drifts of winter, there are elements which have more curative properties than any compound which has yet been prepared by the chemist, and the one who is not too far advanced in illness to spend nights as well as days in living in almost as primitive manner as the Indian of the last century can be restored to health without the necessity of going thousands of miles to sojourn on a mountain top or in a land where snow is unknown.

A Summer View of One of the Model Camps.

At a recent gathering in Pittsburg, Pa., one of the most prominent physicians of the state made an address, in which he gave his formula for the cure of tuberculosis. It was this: "Eight hours a day in the open air, unless the weather is so inclement as to make this a practical impossibility; a clean, healthy diet, consisting largely of milk and eggs; and the exercise of proper precaution against infection from the germs of the disease." The physician in question knew of what he was speaking, for he has been using fresh air for several years as one of the principal remedies in a sanatorium among the Pennsylvania hills, which has received many a patient whose life had been "given up" by the family doctor, and who had

character than the White Haven community, these are conducted on a similar plan. Sites were selected where the surroundings would be helpful to the patients. When the buildings were constructed the architect gave air and sunlight the first consideration. Here the members are encouraged to aid in regaining health by remaining out of doors at all seasons of the year as much as the weather will permit, and both at Rutland and at Sharon the results have been as remarkable as up in the mountains of western Pennsylvania, for weekly are dismissed men and women pronounced "cured" who joined the communities mere wrecks of humanity.

The Christian Scientist may believe that some of the cases are examples of unconscious belief in his theory, and the remarkable change which comes over the victim after a few weeks or months of this life might be attributed to some supernatural cause. Few of the guests at White Haven remain over six months, yet in that period the records show that fully 50 per cent. of the total number leave apparently restored to health. After going to their homes they are carefully watched for any signs of the disease returning, but thus far the restoration has been so complete that only a very small percentage have had a relapse. Fortunately, very complete records have been made at the New England sanitariums, and at Rutland especially each case has been carefully studied. During one year, out of one hundred and forty-one persons treated, fifty-six departed apparently cured, while thirty who were unable to remain longer were so greatly improved that the majority have since literally healed themselves. Of the one hundred and forty-one, seventy-five were what physicians termed in an advanced stage, all of the symptoms being prominent. During the year under consideration only two succumbed to the disease, in spite of the many who were considered by their own practitioners as hopeless cases. The last report of the Sharon

Sanitarium shows equally as good results. Out of forty-two patients who left it during the year, in twenty-three the disease was "arrested," while sixteen were greatly improved. By the term "arrested" is meant all cases where the cough and the fever have entirely disappeared and an examination shows no germs of tuberculosis whatever in the sputa.

It is truly an easy and enjoyable way of getting well for any one who is a lover of nature, for, as has been stated, the main principle carried out is to get in touch with that which is out of doors—to be amid the trees, continually breathing the air purified by natural processes, to exercise and eat and sleep, if possible, with the sky for a canopy. The medical man of the olden time would indeed be shocked, if he could visit one of these places, to see so-called invalids hard at work in the forests making their camps, lolling about in hammocks in summer with heads uncovered, and lying muffled in blankets and furs in the sunlight in the dead of winter, with no shelter but the blue sky above them. But these are only some of the ways in which health is sought. Patients who are able to stand the exercise amuse themselves by clearing away the snow from the verandas in the winter—even the women handling the broom and shovel and enjoying it. Coasting on the hillsides is another strange recreation for those whom we call consumptives encouraged at the Massachusetts institutions. Physical culture is one of the requisites for those who are able to attempt it, and daily a dozen or a score of patients are put through the simple movements, under the guidance of perhaps one of their number or a member of the medical staff. The tent life is a part of the routine of the women in summer as well as of the men, and it is an actual fact that in Massachusetts some of the women have erected their own camps for winter, decorating the walls with posters and photographs and converting them into miniature club houses, where they oc-

cupy themseleves in conversation, reading, sewing and various games.

These camps are unique in many respects. The buildings are composed of but three sides, that facing the south being left open. They are simply sheds, having a floor to prevent the dampness from the ground affecting the inmates. Sometimes forest trees are used for posts, and the walls made of planks or boughs fastened to them. If the temperature is too low for comfort, it is moderated by the use of a small stove, sometimes an open fire. Draught is furnished by digging a tunnel through the earth beneath the shed, terminating in a length of clay pipe. When the fire is started the air is sucked through this conduit, and that keeps it burning brightly.

At all of these so-called sanitariums there is abundant exercise for the men, for they are depended upon to perform the necessary out-of-door work. They secure the wood for the fires in the institution, cultivate the gardens, and keep the walks free from snow. Of course, the labor is regulated according to one's strength, but it contributes to health, and the great difficulty is for the physicians and nurses to keep their charges from overdoing, since the life is so exhilarating. The experience of Dr. Flick and his assistants is that, after becoming a member of the colony, the average patient begins to recuperate so rapidly that he prefers to remain in the open, and chafes when restrained indoors during inclement weather. Seldom do any suffer from the remarkable exposure to the elements, in spite of the rigorous climate in this part of the United States. Some of the winter camps are a mile or more from the sanitarium; but away start the members in the morning, perhaps tramping through two or three feet of snow to reach them. In this rude shelter they are so content that the dinner hour finds them reluctant to leave, and at White Haven a few of the hardier "campers" have been permitted to cook their

own dinners over the heaters, and, providing themselves with utensils, have taken turns in acting as *chef*. The others return to the camps in the afternoon, to stay until nightfall compels them to retrace their steps.

These men and women realize that every breath of the pure atmosphere is a bar to their ailment, and their eagerness to be in it—to inhale it—is not strange when one considers the years some of them have fought to regain their health—years of suffering and endurance which none could appreciate save those who have the same affliction as themselves. Recognizing nature's remedy, it may be said that only when considered absolutely necessary is medicine or stimulant administered, and the comparatively few who require these are usually recent arrivals, whose systems have been weakened by long duration of the complaint. As they improve an effort is made to substitute food for the tonic. The menu is not limited. It includes the usual meats and vegetables, with tea and coffee; but, as already indicated, milk and raw eggs are considered of special value, and all are expected to add these to their daily diet. Sleep is another essential, and physical effort is encouraged as a promoter of it. The occupation of the mind also tends to keep off the melancholy feeling which often affects the consumptive especially, so the social atmosphere is considered to be one of the most valuable features. In fact, the absence of so many of the dreary accompaniments of hospital life is remarked by the visitor, who might easily mistake the purpose of one of these settlements were it not for the appearance of some of the patients whose features tell too plainly the inroads which the disease has made upon them.

Massachusetts and Pennsylvania are not the only states where an attempt has been made to cope with consumption by this form of open-air treatment. Its importance has been studied in the West, and for several years an Indiana phy-

sician has recommended it to his patients. The little colony he has established contains no sanitarium, consisting merely of a few wooden huts built on a slight elevation and surrounded by pine and other trees. The colony is occupied winter and summer. As in the East, exercise proportioned to the strength of the invalid is not only approved, but required. The diet consists of simple, nourishing food. Except where one is very weak, little or no medicine is prescribed, and as the strength returns nature is left to complete the cure. The principal duty of the doctor is to see that his charges observe the rules for destroying the infectious germs by burning their sputa, and to caution them about overexertion as improvement in health brings with it hope and enthusiasm, which leads them to exaggerate their powers of endurance. While the treatment in this Indiana settlement has been limited to a comparatively few persons, nearly all of those who have remained during the period designated by the physician in charge have left it apparently cured, although they included several who had been pronounced beyond recovery.

The success of somewhat similar plans in northern Europe is familiar to the medical profession. The sanitarium at Frankfort-on-Main attracted much attention when first opened by the decision to have the windows consist merely of openings, without glass. Even the sleeping chambers are unprotected, and their occupants are continually exposed to the air currents at all seasons of the year. The possible effect of changes in temperature is counteracted by increasing or decreasing the bed covering. The sun bath on the verandas about the building is expected to be taken by all who are able, and, as in the states, exercise is encouraged. At the Tonassen institution, in Norway, the mercury in winter is close to the zero point for weeks at a time, but the invalids suffering from pulmonary complaint remain out of doors most of the day,

wrapped in blankets and furs, some even taking their midday refreshment in the open. Both of the resorts named are patronized by persons from all parts of the Continent as well as Great Britain, and their mode of treatment has been pronounced not only practical but successful by eminent European practitioners who have made a study of their methods.

For the last twenty years there has been an annual human exodus southward at the approach of winter; thousands of consumptives whose means permitted have resided among the mountains or amid the pineries until warm spring sunshine has melted the snows of the Northern rivers. They have formed communities in nearly every state from North Carolina to the Mississippi river. During the first years of their migration they were welcome—partly because the money they expended represented an important item of revenue to the hotel and boarding-house keeper and tradesman. Hotels were constructed, amusements provided, and other inducements offered to secure their patronage; but in recent years, as this section of the country became attractive in winter to the pleasure as well as the health seeker, the latter has not been welcomed as in the past. The cough of the sufferer is not a pleasant sound, and his presence is not usually agreeable. When thus afflicted, it must be admitted that he is frequently shunned except by fellow unfortunates. Realizing that the presence of this class prejudiced others from becoming their guests, some of the landlords have gone so far as to decline to receive them, and not a few of the advertisements of winter resorts contain this statement: "Consumptives not admitted." Nor is the attempt at isolation confined to the South—it has spread to the mountains of Colorado and northern New York as well as elsewhere in the country, and has become so general that apparently, in the next few years, the victim of pulmonary complaint who wishes to remain at some resort frequented by

those in pursuit of mere recreation will be compelled to lodge at a hospital or sanitarium, as all other doors will be closed against him.

While this attitude may be condemned as both selfish and unjust, it will undoubtedly increase the interest already manifested in the simple methods of arresting the disease already outlined. If they are practical, the question arises: Why go beyond the frost line with the falling of the leaves?—why not remain in the home country, select a spot where the conditions are similar to those at White Haven or Sharon, and there live the life that seems to be so beneficial in these settlements? To the average man or woman its various features attract rather than repel, for it is an existence which eliminates many of the features that tend to depress the invalid, while various influences daily tend to hopefulness and encouragement. In a material sense it is a most economical method of healing, for the simplicity of the daily routine necessitates but a small expense. As an illustration of the fact may be cited the Sharon Sanitarium, where the average outlay for each inmate is but $5 a week—and only this amount is charged. This is truly an important element, for disease does not discriminate between classes, and includes poor and rich alike. There are thousands whose means will not allow them to take advantage of the Southern clime, but must remain at home to battle with their complaint. If the pine or other woodland on the neighboring hillside or plateau can be converted into a source of health thus easily and economically, the boon which the open-air method will confer upon this class alone is of an importance which can not be overestimated.

THE CLIMATIC AND SANATORIUM TREATMENT OF CONSUMPTION.*

By HENRY P. LOOMIS, M. D., New York City.

Climate.—I have seen in the last twenty years innumerable new methods of treatment and cure for this disease hold for a time the attention of the medical profession and the people, but they have all disappeared, and the only method to-day which has stood the test of time and which is recognized all over the world as promising the best results, is what is known as the climatic treatment of consumption—that is, the living in a suitable climate and breathing pure air.

I can almost positively affirm that if any one of you here to-night should develop consumption you would make every sacrifice to leave New York and go and live in a suitable climate. I notice that the medical profession, to a man, when they become infected with the disease, follow this plan. To illustrate this, I found on investigation that of the forty physicians in Denver, thirty per cent. had consumption when they went to Colorado. Climate, then, is the only curative agent which has stood the test of time.

As the seeds of consumption come from the air we breathe, so, in a great measure, its cure is effected through the same channel. I do not believe with some that there is

*A lecture delivered in New York City, April 13, 1903, under the auspices of the Committee on the Prevention of Tuberculosis of the Charity Organization Society of the City of New York. Reprinted, with slight omissions and with the permission of author and publisher, from the "Handbook on the Prevention of Tuberculosis," published by the society.

any specific climate for consumptives, nor do I believe with others that any climate is good provided the air is pure and uncontaminated. While climate is not a specific, it far outweighs all other aids we have in the treatment of this disease. We all know what a tonic effect a change of climate and surroundings has on us when we become run down or tired out. We can not say just what this effect is due to, but we know that we eat better, sleep better, and more quickly regain our normal health than by any other means. This same tonic effect on the general system of the consumptive is apparent, and much more so than in one suffering from any other disease. Climate, then, holds the first place as an improver of nutrition; besides, the pure air breathed in has a distinct and beneficial effect on the inflamed and diseased lung, so we have both a general and a local effect, so to speak. It has been found that the more fresh and bracing air consumptives can breathe, the more they improve; they are advised, therefore, to remain out of doors as much as possible—eight, ten, twelve hours—to sleep with their windows open, and so practically to breathe the pure air of any particular locality for the whole twenty-four hours. I may say that the best climate for a consumptive is the one that will permit him to remain outdoors more and longer at a time than anywhere else; as in health not all climates suit every individual, so the consumptive is found to present personal idiosyncrasies; but it is a safe rule to go by—to remember that the kind of climate in which the person always felt the best before he contracted consumption will most probably be the kind of climate that will agree with him after he has contracted the disease. As sunshine is the greatest foe the consumption germ can encounter, and direct sunlight will quickly destroy the most virulent tubercle bacilli, so that climate which has the greatest number of clear, sunny days is the climate in which most consumptives do the best. This is one

of the great reasons why our Northern winters and springs are so bad for consumptives—this and the sudden changes of temperature which are of such constant occurrence. Places, no matter how favorably situated as to general climatic conditions, may from some local cause, such as the too close proximity of high mountains, liability to high winds, or sudden changes of temperature, be rendered unfavorable for consumptives. At one time it was thought that consumptives could hardly stand a cold climate, and I can remember how twenty years ago they were sent to our Southern climates, such as Florida, especially to escape the cold. This has all changed now—and it is a well-known fact, which has been emphasized by Dr. Trudeau in his experience in the Adirondacks, where the temperature for much of the time is below zero, that consumptives always do better in the winter than in the summer. Experience has proven that the majority of people living in low altitudes, or sea-port cities, when they contract consumption, improve more rapidly if they make a change of climate to inland and to elevated regions. Altitude, I believe, is a very important element in the climate for a consumptive. It is not necessarily the high altitude of five thousand feet of Colorado, but in my experience most cases do better at an elevation of about twelve hundred feet. I know there are some exceptions, such as when the disease develops in those advanced in years, in those of unusual nervous temperament, or people in advanced stages of the disease. Another element of climate which experience has proven is important, is dryness. So important do some of the English physicians consider this that they are now sending their patients to a health resort recently established in the desert about ten miles from Cairo. Here it is so dry that meat exposed to the air never spoils.

Wherever we find this combination we may rest assured that consumptives will do well, and if not in a too far advanced stage of the disease, will recover. We are fortunate in having in America the finest and best climate the earth affords—where also may be found the comforts of life which are so essential in cases at all advanced.

From what I have just said, you readily perceive that there are three elements of climate which are to-day most generally believed to be essential for people with consumption.

1. *Sunshine: The Maximum Amount of Clear Days With Sunshine.*—The conditions of high and dry climate are best met in our country on the elevated plateaux of Colorado, New Mexico and Arizona, and at such places as Denver, Colorado Springs, El Paso, Las Vegas, Albuquerque, New Mexico, and Phoenix, in Arizona. The conditions of moderate elevation and pure atmosphere we find in Asheville, North Carolina, the Adirondack mountains, and at Sullivan county in our own state (New York), while the soft and soothing influence of a pure and balmy atmosphere is provided in Lower California, in Aiken, and in Thomasville, Georgia, and at Nassau. It has been found that strong individuals in the first early stages of consumption do exceedingly well in a colder climate, while advanced and feeble persons improve in balmy and low altitude situations.

2. *Altitude.*—We all know that as we ascend there is a marked reduction in the pressure of the atmosphere. This is so much so in very high altitudes that it is almost impossible to breathe. In high-altitude health resorts, on account of this diminution of pressure, greater work is put upon the heart and lungs, so that by the process of rapid heart and lung action increased nutrition is brought to the diseased lung. Purity of air really means air free from germs. It has been

proven that ten cubic meters of air in New York contain, on an average, fifty-five thousand germs. It has also been shown that germs steadily diminish as the altitude increases, and at an elevation of thirteen thousand feet they are no longer found in any portion of the globe. The danger of inhaling ordinary germs is that a mixed infection may occur, by which is meant that the changes in the lungs caused by the tubercle bacillus, the germ of consumption, may be rendered much more active by the entrance of other germs.

3. *Dryness.*—Dryness in the air is also an important factor in climate. It has been proven by experiments that the consumption germ multiplies very rapidly under moisture, and the inhaling of moist air seems to have the effect of stimulating their activity in the lungs.

It will be readily seen by one who visits open health resorts where a number of consumptives are collected together, why many of them do not improve. The climate may be ideal, and the invalids may be having the most nutritious food, and still the general life they lead does away with all the climatic advantages. Late hours, excess in eating and drinking, staying in closed and badly ventilated parlors in the evening, neutralize any beneficial effects, and the patient most probably leaves, blaming the climate for the lack of improvement, when the result is due entirely to the fault of his manner of living. I have known many a young fellow with only a slight trouble in his lungs to die in the Adirondacks, more from the effects of whiskey than from the disease itself. It is difficult for many people to adapt themselves to a methodical plan of life long enough to establish a permanent cure in consumption. Personality has long been a main factor in determining the prognosis.

SANATORIUM TREATMENT OF CONSUMPTIVES.

During the last five or ten years a new method of treating consumption has taken hold of the medical profession in this country, and, to a certain extent, of the people—namely, the entrance into and continued residence in sanatoriums especially established and equipped in suitable localities for the treatment of this disease. This plan of treatment has been in vogue in Europe, and especially in Germany, for nearly thirty years, but it is only in recent years that the Americans have adopted the method; and even now wealthy Americans do not take kindly to the restraints and discipline necessary in the conducting of these institutions. In Germany all classes, when they become consumptive, the prince and the pauper, enter one of the innumerable institutions. It is a well-known fact that the comparison between patients in the sanatoriums situated in favorable climates and patients in hotels and boarding houses in the same region, shows that the increase in the number of cures is almost two to one in favor of the sanatorium, and when I explain to you how these sanatoriums are conducted you will readily see why this is so. Consumption is a disease with periods of quiescence and periods of exacerbation (increase of activity or violence). During one of these periods of exacerbation, which are generally accompanied by fever, increase of cough, and expectoration and night-sweats, due, as the patient thinks, "to catching cold," but really to overexertion, disturbance of digestion, and nervous excitement, the disease makes inroads, and finally, after one of these acute attacks, the patient recovers, but hardly ever with the same condition of the lungs as before, more of the lungs having been destroyed. After a longer or shorter period of apparently good health, another acute attack develops, and so on. Now the constant observation under which the patient is kept

by the trained medical men in these sanatoriums enables them to detect the least variance in the patient's general condition, such as slight fever, often so slight as to be imperceptible to the patient, and it is attended to before any headway is made. It is the constant daily care and close observation of the sick consumptive and the attention bestowed on his manner of living that turns the balance in favor of the sanatorium patient.

A word as to how sanatoriums came to be established for the treatment of consumption:

In 1859, Dr. Brehmer, of Gœrbersdorf, Germany, having had his attention called to the teachings of an obscure country practitioner, Dr. George Bodington, living at Sutton, Manchester, England, as to the value of pure air and out-of-door life in the treatment of this disease, was led to establish the first sanatorium, where the suggestions of Dr. Bodington were carried out. From that day the idea of sanatoriums has steadily gained ground. They are now in every portion of the world, and to-day in Germany alone there exist thirty-three popular institutions, many of them established by the state, others by the government insurance companies, and still others by philanthropists, and some as good investments for capital. German insurance companies invested last year over one million dollars in sanatoriums for consumptives, and expended nearly another million in maintaining these institutions.

England has been for a long time far ahead of this country in possessing several institutions for the treatment of consumption, as it is well claimed that of the reduction in the death-rate from consumption during the last thirty years in England, nearly one-half is directly traceable to the general doctrine of the sanatorium plan of treatment.

What do we mean by a modern consumption sanatorium? It is an institution devoted to the treatment of consumption, situated in a healthy locality free from dust and dampness,

and generally at some elevation. The greatest care is exercised in the buildings and in the surroundings to avoid the possible transmission of the disease to employees or neighbors of the institution, and equal care is exercised to prevent the re-infection of the patients themselves. The cardinal rule, which is enforced in all these institutions, is daily observed as to the expectoration from the patients, and the insistence that patients should only spit into certain prepared receptacles. In the United States at the present time there are three kinds of consumption sanatoriums: First, those that have been built and supported entirely or in part by funds furnished by the various state treasuries. Second, sanatoriums which have been built and equipped by philanthropic people to give climatic advantages to those who are unable to pay the excessive charges of boarding-houses and hotels in well-known health resorts. Third, sanatoriums charging $15 to $25 per week. At this rate institutions ought to be self-supporting.*

To illustrate how the sanatoriums are enabled to accomplish the rapid cures which are effected in most of them, I shall describe the daily life of the patient who has entered one of the large German sanatoriums with the disease fairly well advanced.

The object of all sanatorium treatment is to have the patients spend the greatest number of hours in the open air, and it is found that the majority improve more rapidly, especially during the early stages of their stay, by rest rather than exercise. Improving the general nutrition of the patients is also another object, and this is accomplished by giving them as

*For a descriptive list of sanatoria in the United States and Canada, practically complete to January, 1905, see the "Directory of Institutions and Societies Dealing with Tuberculosis," published by the Committee on the Prevention of Tuberculosis of the Charity Organization Society of the City of New York. This book may be obtained from the secretary of the committee, 105 East Twenty-second street, New York, for $1.00.

much to eat as they can assimilate. With these two objects in view the following is the daily regime:

At eight o'clock in the morning a domestic enters the bedroom of the patient and closes the windows, which have remained open all night. He lights a fire and serves the first breakfast. After this the patient arises and is comfortably arranged in a long chair something like a steamer chair, out of doors, generally on a protected porch. His legs and body are warmly covered, and often a hot-water bottle, if the weather is cold, is placed at his feet.

About eleven o'clock concentrated nourishment is brought to the patient, a glass of milk, some egg-nog, or bouillon. At twelve there is dinner, after which the patient enjoys a promenade, which varies according to the prescription of the physician. The promenade is made on a terrace or in a winter garden connected with it. Afterwards the patient resumes his place in the reclining-chair and passes the whole afternoon in a state of absolute repose. A quiet game of cards, dominoes, conversation, or reading is not forbidden. Certain patients indulge in profound sleep, and care should be taken that this in no way interferes with the sleep of the night. Often at four o'clock nourishment is brought to the patient. After this dinner is served, and after dinner another promenade shorter than that in the afternoon. The person then returns to the reclining-chair and remains there until ten o'clock in the evening, and then retires and sleeps in a flannel gown. The windows should be open all night. As patients improve they are allowed to take more exercise and prolong the promenade. In sanatoriums in this country such a rigid regime is not usually enforced unless the patient has fever. It is a plan in the best sanatoriums with which I am acquainted to keep the patients absolutely in bed if they are having a high fever. In some of the sanatoriums the beds are arranged on tracks, a plan which

enables them to be wheeled out on the porch, so that the patients can lie in the open air.

From experience of a number of years in examining a very large number of cases for the Adirondack sanatorium and for the one at Liberty (N. Y.), I am fully convinced that six months is the average time that is required to bring about so complete a cure that the patient can return to his former life with safety. I have seen a number of cases accomplish this in three months, but they are exceptions.

To believe that consumption is a curable disease one has but to consult the statistics furnished by the large sanatoriums. From any institutions which only receive patients in the very early stages of the disease, seventy to seventy-five per cent. are discharged cured. In most of the sanatoriums of Europe, where people in all stages are taken, statistics show that twenty-five per cent. are absolutely cured, and fifty per cent. leave much improved, and many of them capable of earning their living. The question is often raised if these cases discharged cured remain cured. Dr. Trudeau, of the Adirondack Cottage Sanatorium, which has been in existence for about fifteen years, is in constant communication with 115 patients who have been discharged, and while a few have relapsed slightly, the majority of them are well and living in their own homes. If people would remember these statistics, they would not question the curability of phthisis, but know that the ratio of cure is in proportion to the time in the disease when the climatic treatment is commenced. If the consumptive could be impressed with the fact that he might lose in one week by continuing his daily occupation what would take him two months to regain under the best climatic advantages, there would be less procrastination in people who could well afford to make the change.

If I were asked to what is due the success of the sanatorium treatment of consumption at the present day, I should say it was owing to the thorough and constant supervision of the consumptive, the immediate intervention when new symptoms manifest themselves or when old ones become aggravated and do not disappear readily enough, proper food and drink, and the personal education which the patient receives from the trained physicians who are devoting their time to his care. Not the most beautiful and healthful climate nor the most delightful resort can cure the consumptive patient if he is not wisely guided in treatment. All that the patient will have learned from the sanatorium rules and regulations and the daily advice of the physician is how to protect himself and others from contracting the disease; how not to take cold, and how not to lose what he has gained during precious hours of persistent effort.

FAVORABLE AND UNFAVORABLE CLIMATES FOR TUBERCULOSIS.*

By HENRY B. DUNHAM, M. D., of the Massachusetts State Sanatorium, Rutland, Mass.

My experience with climate has been too limited for me to have decided views, or to make dogmatic statements on the subject. During the past five years at the Massachusetts State Sanatorium we have always tried to assist patients who, when discharged, had an opportunity to go to more favorable climates, and about 100 such patients (many of whom were clinically cured in Rutland) have taken up residence in the more favorable climates of western states.

It was with the object of securing information on the effect of climate in these cases that I recently visited and examined these patients. The Massachusetts Sanatorium makes every effort to keep in touch with its ex-patients.

On account of the consensus of opinion on the subject of climate, we have always felt less anxiety about patients who

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*Reprinted, with permission of author and publisher, from the Colorado Medical Journal for March, 1904. The compiler feels that this is one of the most instructive articles on the subject of climate that has yet appeared. Notwithstanding the general and well-founded belief that climate is an important factor in the cure of tuberculosis, it is certainly a matter for thanksgiving, on the part of thousands who can not seek a favorable climate, that climate is not the only factor, and that tuberculosis can be cured in practically any climate. Whatever difference of opinion may exist among the authorities as to the relative importance of climate, it is now generally agreed that unless the patient is financially able to procure in a favorable climate proper nourishment and attention, it is far better for him to remain at home, where he can obtain these at less expense. Climate alone will not cure.

could reside in the West than about those who were obliged to remain and work out their salvation in our eastern climate. Over 2,000 patients in all have been discharged from the Sanatorium. Comparison of the subsequent histories of those discharged patients who went to western resorts, with that of those who remained in the vicinity of their own homes, corroborates our belief in the efficacy of residence in dry climates; but it does so with a smaller margin in its favor than was anticipated.

The result of observations while visiting patients in the West led me to conjecture the possibility of two individual types of phthisical patients, who, without especial reference to the degree of advancement of the disease, require almost opposite climatic conditions for the best result possible in each case.* I was strengthened in the formation of this opinion

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*In a letter to the compiler the author says: "The suggestion, where I mention the possibility of two individual types of patients requiring different climatic conditions, was made with the hope of stimulating inquiry into this question, especially at the new institutions in the West, where a large number of cases are under observation. I had hoped that some time there might be an opportunity for a study of this question at large institutions in the East and West in conjunction. I have long thought, and still think, that any tuberculous invalid, before trying the West, should first enter a sanatorium and try sanatorium conditions for a period in the East. There should be a daily chart of pulse and temperature for a period of a month, with careful record of weight and physical signs made during the waiting period, so that comparisons could be made of progress after the patient has arrived in the West. Now, if a patient who is fairly well in the East, when he arrives in a western resort and places himself under the care of a physician, finds that there is a daily rise of temperature and other manifestations of activity of the disease, there is nothing to assist his new physician in deciding whether this activity is a new development or something which has gradually come on, and any exacerbations after his arrival might easily be attributed to a general and expected progress in the course of the disease; whereas, if over a known period prior to the change of climate there had been recorded a condition of almost absolute quiescence of the disease (with some gain in weight and diminution of symptoms), the new and increased symptoms would then be attributed solely to the journey or change of environment. In the few cases where altitude and climatic conditions are not well borne, an early realization of this fact is of the utmost importance, that the patient may be allowed to return to the conditions

by the results observed at the United States Army Sanatorium at Fort Bayard, New Mexico. This institution is ideally located as regards altitude and dryness of atmosphere, and the food and medical care are practically identical with that at Rutland.

The Massachusetts institution accommodates exactly the same number of patients, and both institutions are obliged to take an undesirable number of advanced cases. The class of cases during the first year at each institution was practically the same, and during subsequent years both places have been able to admit rather more incipient and hopeful cases of the disease.

Taken as a whole, the results at Rutland have been at least as good as at Fort Bayard, and I say this after a careful comparison of results reported, and from facts and impressions received during my brief visit.

Everyone will agree that, generally speaking, the more advanced tuberculosis becomes the less advisable it is for invalids to seek treatment in new climates or at great distances. For this reason a comparison of the results of the treatment upon the most incipient cases admitted to the Army and State Sanatoriums respectively may be considered as especially of interest. I quote from Dr. Bullock in a paper read before the

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which seemed better adapted to his case. A large part of the population of the West is composed of consumptives, who have become cured, and not a few of the physicians belong to this class. It would not be strange that any one who has received such immense benefits from the climatic change should be partially blinded to the possibility of its disagreeing with any one else, and I think that where comparison of the patient's condition, before and after the change, is not made thorough, there is a strong temptation to consider what is really increased activity of the disease, due to the change, as being either an index of patient's former condition or a mere exacerbation, which would have occurred in the East, such as may be expected in the course of time in all cases of tuberculosis. My whole article was not so much for the purpose of instruction as for exciting inquiry into the characteristics which distinguish these two types."

Philadelphia County Medical Society after his two years' service as pathologist at Fort Bayard.

"Twenty-two per cent. of the cases admitted during my term of service belonged to the most favorable class, that is, that in which temperature is normal and in which bacilli are absent. The diagnosis in these cases was confirmed by the tuberculin test whenever possible. As might be inferred, in none of this class did hemorrhage occur."

In the Massachusetts Sanatorium, under Dr. Bowditch, 68, or 25 per cent. of the cases discharged during the last year, had not shown tubercle bacilli in their sputum, although positive physical signs were present, tuberculin being used for the purpose of confirmation. There were among these a few cases of febrility, and over 45 per cent. of these patients had had haemoptysis.

Dr. Bullock states: "The results in this class were 40 per cent. clinically cured, 43 per cent. improved, 17 per cent. unimproved, and none died."

At the Massachusetts institution the average length of stay for the 68 patients being considered was four months, this being also the average length of stay at Fort Bayard during the period reported upon by Dr. Bullock. The results of the treatment of the 68 patients belonging to the class in question, under Massachusetts climatic conditions, were 89 per cent. clinically cured, 11 per cent. improved, none not improved and none died. Dr. Bullock states that, "These cases are examples of the most favorable type of tuberculous invalids, and for this reason researches in climatotherapy can not fairly be based upon the results." Continuing, he states: "Fifty-nine cases belong to the class in which, though the temperature is normal or but slightly elevated, bacilli are present in the sputum. None of this class died. Twenty-nine per cent. were discharged unimproved, 48 per cent. improved, 16 per cent were conval-

escent, that is, without bacilli, and 7 per cent were able to pass the tuberculin test." (That is, 23 per cent. clinically cured.) "In this class the usual lesions were infiltration and consolidation, and in a small proportion there were cavities. This is the type in which the results of climatotherapy may be employed fairly for purposes of comparison with treatment in unfavorable climates. If, under equally good conditions, the results are better than can be obtained East, then the question of climatotherapy in tuberculosis is settled, and it is right to send these people West. However, comparison is not as easy as it seems, for at most of the large institutions in the East none but incipient cases are admitted, and in discharging patients the ambiguous term 'arrest' is employed, and that little word may cover a multitude of bacilli."

The Massachusetts State Sanatorium in its annual report for 1903 tabulates 484 cases treated. Two hundred and twenty-three of these had advanced phthisis, the remainder having only an incipient form of the disease. When the term "arrested" is used in reporting results, absence of all symptoms and bacilli is insisted upon before applying the term. Many institutions and physicians use the term "cured" to designate the same condition.

When the different types of cases are tabulated and concisely described as in Dr. Bullock's paper, it is comparatively easy to make just comparisons with similarly selected cases. The 223 cases of advanced phthisis treated at Rutland without question do not fall short of the amount of disease required to admit them to the second class division made at Fort Bayard. All had tubercle bacilli in the sputum, in many there were fever and night-sweats, some had cavities, and some laryngeal tuberculosis. A number of them certainly ought to belong to the third class of cases described by Dr. Bullock, having permanent febrility, 50 per cent. of which class died

at Fort Bayard. The results in the 223 cases was one death, 13 per cent. unimproved, 64 per cent. much improved, and 21½ per cent. arrested or apparently cured. In the "arrested" cases bacilli had disappeared from the sputum, then the sputum had disappeared, also the cough and all symptoms. As Dr. Bullock says, the only thing left was "the evidence of a former lesion demonstrable upon physical examination."

MOST FAVORABLE CLASS OF TUBERCULOSIS PATIENTS.

	Clinically Cured. Per ct.	Improved. Per ct.	Unimproved. Per ct.	Deaths.	Per cent. of total number.
At Fort Bayard.....	40	43	17	0	22
At Massachusetts Sanatorium..	89	11	0	0	25

LESS FAVORABLE CLASS.

Omitting most unfavorable class at Fort Bayard and including most unfavorable class at Rutland.

	Clinically Cured. Per ct.	Improved. Per ct.	Unimproved. Per ct.	Deaths.	Cases.
At Fort Bayard.....	23	48	29	0	59
At Massachusetts Sanatorium..	21½	64	13	1	223

I am unable to account for the above stated facts in the light of generally accepted opinion, and conclude that if the reason for success in Massachusetts is due in any way to climate, then it must be that moderate moisture is at least not injurious to many tuberculous individuals. It seems that the proportion of people adapted for treatment in the extremes of climate instanced by Massachusetts and New Mexico must be more nearly equal than thought possible by climatologists generally. That is to say, a small majority of the patients at the Rutland Sanatorium would probably do better at Fort Bayard, and a large minority there might do better here.

That there are at least some cases of incipient tuberculosis which can do better in eastern climates is made evident from the fact that some few cases have improved in Rutland after

failure to do so under the best of care during a lengthy trial in western arid regions.

I hope that, with the future establishment of sanatoria in the West, an opportunity for more accurate study of this subject will enable the physician to advise correctly when recommending localities and climates.

In this connection I must not omit to emphasize the great value of continued medical supervision in all cases, even in "arrested" tuberculosis.

The subsequent histories of discharged patients who remained in the employ of the Massachusetts Sanatorium is distinctly more favorable than the same reports received from its eastern or even its western ex-patients.

It is remarkable how life can be prolonged in patients who are quite far advanced in tuberculosis, but who are willing to keep up a continued fight by living in the open air and following medical advice during the least exacerbation or complication. The town of Rutland always contains many tuberculous invalids who are too ill to be accepted at the time of their first examination for admission to the Sanatorium. Frequently these patients improve and are admitted later, and many quite advanced cases, under proper care, remain comparatively well while residing where all influences tend to an open-air life.

My impression of the tuberculous invalid as seen in western resorts and at Rutland was that patients became better or worse, as the case might be, faster in the West and slower in the East; and that the ability to gain in weight, setting aside other symptoms from consideration, was distinctly more marked among those remaining in what might be termed their own climate.

No one who has not been intimately connected with the Massachusetts State Sanatorium can realize how conservative *has been its spi*rit in reporting results. The average duration

of the disease prior to entrance has been from ten to twelve months, and at times patients have been admitted who could not possibly take such a journey as that necessary to reach New Mexico, for instance.

I believe that tuberculosis, when it can be cured by life residence in the West, is more satisfactorily cured and the prognosis is better, than when the same result is sought in an eastern climate; for a continuous open-air life all through their lives, after as well as before arrest of the disease, is a *sine quo non* with patients in the East; but in the West, when it is *climate* which arrests the disease, its influence remains continuously, subject to no effort on the part of the patient. Consequently I would not detract an iota from the great value of aridity and altitude in large numbers of cases for which it is the remedy par excellence.

THE ARID REGION AS A RESORT FOR CONSUMPTIVES.*

By ROBERT W. CRAIG, M. D., Phoenix, Arizona.

The recent tendency of many medical men has been more and more to pay no particular attention to climate in the treatment of pulmonary tuberculosis, but to endeavor to carry out a plan of home treatment. In general, this seems to me to be a decided step backward, certainly in those cases that have the necessary means to secure proper climatic treatment, and the other natural advantages that are most likely to result in the cure of their disease.

For the great majority of tuberculous patients much the best results can be undoubtedly obtained in a comparatively warm, dry and equable climate. Not that any particular climate has a specific action upon the disease, but in certain climates the best results can be obtained from an outdoor life. Where can the patient spend the most time in sunshine, where are the most equable temperature, the least humidity, and air most free from dust and bacteria?

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*Taken substantially from two papers by the author, "Climatography of Arizona, with Special Reference to the Climatic Treatment of Pulmonary Tuberculosis" (Journal of the American Medical Association for January 25, 1902), and "Should Pulmonary Tuberculosis Be Treated at Home?" (New York Medical Journal and Philadelphia Medical Journal for December 3, 1904, copyright, 1904, by A. R. Elliott Publishing Co.).

Special attention is called to Dr. Craig's opening statement as to the advantage of the climatic treatment for those who can afford it. While it is happily true that tuberculosis can be cured in any climate, and it is better to be treated in comfort at home than to go to the most favored climate without the means of securing necessary comforts, yet it should be remembered that the authorities are practically agreed that the treatment in a *favora*ble climate is the best when available to the patient.

That outdoor life alone is not all sufficient in the treatment of these cases is demonstrated by late statistics, which show that thirty per cent. of the adult population of the Philippines, where oudoor life is the common mode of existence, die of some form of tuberculosis.

The four factors which most directly contribute to favorable climatic conditions are sunshine, relative humidity, temperature, and altitude. Climate as affected by mere latitude does not seem to have any influence on the disease. The death-rate from this cause is practically the same in New York, at a latitude of 44 degrees, and Manila, which is only 15 degrees from the equator.

Sunshine.—The value of a maximum amount of sunshine can not be overestimated, as the humidity and temperature depend upon it in a large measure. Its influence upon the mental condition of the average patient is very pronounced. When the day is cloudy and the humidity great, he is depressed and can hardly be induced to get out of the house. When the sun is shining brightly, his melancholia disappears, and he wishes to put in as much time as possible out of doors. The entire area composed of Arizona, New Mexico, western Texas, southern California and Nevada has an unusual amount of sunshine as compared with eastern states.

As an illustration in point, the average daily sunshine for the month of February in Phoenix, El Paso and Redlands is over eight hours. Numerous points of observation in Arizona are reported by the United States Weather Bureau as having less than fifteen entirely cloudy days during the year 1903. Knopf speaks of the great amount of sunshine enjoyed by invalids at Davosplatz, Switzerland, mentioning that the average daily sunshine for the month of November is 4 hours, 16 minutes, which is truly a relatively large percentage; but when compared with 9 hours, 12 minutes, reported by the

Weather Bureau at Phoenix for the same month, is small indeed. Phoenix has the greatest percentage of sunshine recorded by any United States Weather Bureau office, and during the year 1900 there were but five days on which the sun did not shine there.

Humidity.—A low relative humidity, which depends to such a great extent upon the sunshine, is probably the most important of all climatic conditions in its relation to the cure of pulmonary tuberculosis. In northern Asia, the Rocky mountains, and the great plateaux of central Africa, where there is a minimum amount of moisture in the atmosphere, the disease is comparatively rare, and clinical evidence has taught us that tuberculous cases improve much more rapidly and that the percentage of recoveries is much greater where the air is dry.

The lack of moisture in the atmosphere, as reported by the United States Weather Bureau at Phoenix, is truly surprising. On several occasions during the month of June, 1900, the relative humidity fell as low as 1 per cent. as compared with 50 and 60 per cent. in Chicago and eastern cities. The average annual rainfall recorded at Phoenix is 6 inches, as compared with 35 inches at Asheville, N. C., 18 inches at Los Angeles, and 15 inches at Denver, Colo. The official weather reports demonstrate that Phoenix has the lowest percentage of humidity and the maximum amount of sunshine of any city in the arid belt, which effectually controverts the statement that has been made that the irrigation in the Salt River valley had interfered sadly with its climate for pulmonary cases.

One specially noticeable effect of the dry air is the great diminution in the amount of sputum in those cases where there is excessive bronchial catarrh accompanying the tubercular *lesion.*

Temperature.—Temperature in itself is not so important, except as to its influence upon the total amount of sunshine and the relative humidity. Its greatest influence is perhaps in the amount of time a patient is allowed to spend out of doors. On the whole, a high average annual temperature is perhaps the best for the majority of cases.

The temperature of this region, particularly Arizona, is higher by an average of 20° to 25° in summer, and 30° to 40° in winter, than that of the eastern and north central states, yet the humidity is so low in summer that the sensible temperature is much less. As a matter of fact, the sensibility of the human body to heat is really less in Arizona than in New York. A temperature of 110° in Arizona is much less unpleasant than a temperature of 90° in Chicago. Thermic fever is unknown, even in the hottest summer months. I have known of a few persons somewhat overcome by the heat, but they never had elevation of temperature, or the symptoms common to sunstroke, and a careful inquiry generally elicited a history of alcoholism. The annual mean temperature for the western division of Arizona for 1903 was something like 74°, which permitted the patient to live in a house tent the entire year. The government reports show an average temperature for fourteen years at Phoenix for December of 65°, for January of 58°, and February of 63°. The nights throughout the winter are apt to be cool enough for open wood fires and for blankets. Generally overcoats are not needed during the day, even in the midst of winter.

Altitude.—Altitude does not seem to have any very pronounced influence on tuberculosis. It is true that many patients improve markedly after removing from the East to a high altitude in the mountains. But it is questionable whether the benefit derived is not due primarily to other causes, notably dry air and improved hygienic surroundings. There are ww-

questionably important blood changes at a higher altitude and the assimilative powers are temporarily stimulated, but it is open to question whether or not the benefit is not more than balanced by the over nervous stimulation and tachycardia produced. In an active state of the disease a high altitude is certainly contraindicated on account of the extra amount of work thrown upon an already weakened heart.

In Arizona the variations in altitude are very pronounced, and this is a striking advantage in some respects, as with the same general conditions as to temperature and dryness of air the physician is able to select nearly any altitude he may desire, ranging from sea level at Yuma to 6,800 feet at Flagstaff.

General Climatic Conditions in Arizona.—The climatic conditions of Arizona are unlike anything else in the world. The territory is located between the two greatest ranges of the Rocky mountains, between 30 and 35 degrees north latitude. It is largely comprised in an extensive plateau that has climatic features so distinctive as to merit a separate place in the classification of climates. Hundreds of miles from any large body of water, traversed by lofty mountain chains, and surrounded for several hundred miles on every side by sandy deserts, it has the natural physical conditions which combine to make it the ideal climate for the consumptive. We rarely contemplate the far south latitude of the region when thinking of Arizona, but nevertheless it is almost exactly of the same latitude as Cairo, in Egypt, and the greater portion of the territory has a very similar climate.

The general slope of the country is toward the south and west, ranging from an average altitude of 7,000 feet at the Grand canon and around Flagstaff, in the northern part, to sea level in the south and west, in the locality of Yuma, which is erroneously but popularly supposed to be the hottest town

in the United States. The northern and eastern portions of the territory are to a very large extent mountainous, and covered with pine and cedar forests, which, being almost entirely clear of underbrush, form magnificent natural parks. This region is the watershed from which source is derived the water used for irrigation of the famous Salt River valley, which bears to Arizona the same relation as does the valley of the Nile to Egypt, and which archeological authorities claim has been under cultivation for an even longer period than that valley.

The two principal towns in the northern part are Flagstaff and Prescott. Flagstaff is a beautiful little city of 2,000 inhabitants, and was certainly intended by nature for a summer resort. It has an altitude of about 7,000 feet, and is located about the center of the National Forest Reserve, which includes the San Francisco mountains and the Grand canon of the Colorado. During the warmest summer months the temperature here rarely exceeds 80 degrees, and at all times blankets are necessary to comfortable sleeping. This region is particularly rich in the natural objects of interest which are so necessary to occupy the time and attention of the semi-invalid. The Grand canon of the Colorado, certainly the greatest scenic wonder of the world, is now reached by railroad, connecting with the main line of the Santa Fe at Williams, as well as by an automobile line which makes the trip from Flagstaff to the rim of the canon in eight hours. In and around this region within driving distance of Flagstaff are Montezuma's castle, probably the most famous of the Aztec ruins, Montezuma's well, the crater of an extinct volcano, a petrified forest, Cataract canon, with its village of Supai Indians, and beautiful waterfalls, and Walnut Creek canon, with its cave and cliff dwellings. The mountains and canons in this locality are the sportsman's paradise. In the southern

portion of the territory is the Salt River valley, which is probably the objective point of more people seeking to escape the rigors of the northern winters than any point in the Southwest. This valley is about 60 miles long by 30 miles wide, and is as level as a floor, with a gradual slope to the southwest. It was at one time the seat of Aztec civilization, and it has been estimated from the immense ruins found in various parts of it that this region formerly had a population of about 300,000. Even now, ancient canals may be distinctly traced, demonstrating that a most elaborate and extensive system of irrigation was carried on. Near Phoenix, Casa Grande and Tempe are the ruins of prehistoric cities that were beyond question more populous than any now in existence between Denver and the Pacific Coast. The valley is now largely under a high state of cultivation and is a veritable oasis in the desert. It is mostly given up to citrus fruit growing, and the orange groves within five or six miles of Phoenix are one of its most attractive features. A belt stretching for miles along the foothills produces the finest oranges grown in America, and a ride along some of the driveways skirting the canals which supply the water for irrigating these fruit orchards is one of the best tonics available. Killing frosts are practically unknown, and even during January and February, the coldest season here, the apricot and almond trees are in bloom and alfalfa fields are as green as an Illinois lawn in June.

Phoenix, the capital and commercial center of the territory, is located in the Salt River valley and is a thoroughly modern town of about 15,000, with electric lights, street cars, the best winter hotels and probably more churches and school houses than are to be found in towns of equal population in the East.

As the manifold climatic advantages of this territory, chief of which are an even temperature, medium altitude, mini-

mum humidity and maximum amount of sunshine, are becoming more and more clearly recognized by the medical profession in the East and North, the tide of winter travel is tending in this direction, until Phoenix, in particular, of its many towns, is the objective point of a far greater number of pulmonary cases than any other city of equal population in the Southwest. The greatest number of invalids are of the tuberculous class.

They recover in encouraging numbers; in such proportions, indeed, that it is the strongest argument that suitable cases should invariably be sent from the colder regions of the North and East to a climate where the conditions are such as to make an outdoor life the natural existence. By passing the summer in Flagstaff, the fall in Prescott, the winter and spring in Phoenix, the invalid may enjoy the advantages of the Riviera and the resorts of Switzerland and Egypt, with practically none of their disadvantages.

Tent Life.—Undoubtedly the best results attained here have been by a tent life on the desert at the foothills, which extend within six miles of Phoenix. During the past few years it has been my good fortune to come in rather close contact with numerous patients who live in one or the other of several tent colonies in the immediate vicinity of Phoenix, and it has been my observation that as a rule they are almost entirely ignorant of the ordinary rules which should govern the daily life of every individual who has tuberculosis, and I think it is our duty fully to acquaint these patients with the nature of their illness, as much for their own safety as for the safety of others. It is not possible properly to treat a patient for tuberculosis who is not fully aware of the nature and gravity of his disease. Rules made for his guidance will not be obeyed unless he knows what is the matter with him, and that their violation will be followed by immediate disastrous results. No

harm can come from telling a patient that he has tuberculosis, and explaining to him that it means a persistent, continuous struggle for his existence for a term of years. He will soon recognize that his welfare depends largely upon his own efforts and will become a good patient, where otherwise he would be but an indifferent one.

Unless the patient understands this fully, as soon as he begins to improve he is likely to stop treatment, thereby greatly lessening his chances of recovery. Unremitting attention is demanded of both patient and physician as to the mode of life to be followed in these cases. It is easily possible for a patient unwittingly to do himself more damage in one half day than can be repaired in a month.

Any method by which the patient can be induced to spend the most time out doors is to be warmly commended. There is a general impression amongst the laity that with the doors and windows open they enjoy all the advantages of proper ventilation, but this is not correct. If the window faces the wind, air is forced to a greater or less extent into the room, but there is not much interchange of air. If opposite windows are open the draft is likely to produce mischief. By far the best way in favorable climates is to have the patient live in a tent house, where he can have all the comforts of the home and be practically out of doors the year round.

Tent architecture is a very large factor in the success of tent life. The tent for one person should have a frame work of lumber and should be about 15 by 18 feet in dimensions. An absolutely tight board floor is very essential, and a tight wall should be built around the side, and about three feet from the floor. Over this the tent should be stretched, and a heavy fly should cover the entire tent. This gives enough space for two comfortable rooms. The upper part of the walls should be made detachable, so that they can be raised and lowered

and converted into an awning, which changes the tent house into the best sort of pavilion. Tent life, when governed by well selected rules, becomes thoroughly enjoyable and the patients, who generally at first have exaggerated ideas of its inconvenience, become loath to leave it. Results obtained from this out-door life, studied clinically, may be briefly summarized as follows: Loss of temperature, increase of appetite, improved nutrition, with consequent gain of weight, decrease of cough and the disappearance of night-sweats, and also an absence of the "colds," which are the bane of the consumptive's existence. When carried out under intelligent direction, these results are in such marked contrast to those secured where patients live in boarding-houses and hotels, that the most skeptical can but be convinced.

DENVER AND PULMONARY TUBERCULOSIS.*

By Wm. N. Beggs, M. D., Denver, Colo.

Physician to the National Jewish Hospital for Consumptives, Denver, Colo.

Perhaps that which most attracts the attention of a physician who is a recent comer in Colorado is the large number of consumptives he sees who have come on account of the great reputation which the climate has for benefiting that class of sufferers. A little longer acquaintance with the people introduces him to a class, perhaps not quite so numerous, who are now the picture of health, even of robustness, and boast an entire freedom from the symptoms of that dread disease—phthisis—to which they were subject on their arrival. "Lungers" and "ex-lungers," as they are familiarly designated here, are very numerous in this state. Inquiry among the latter class will reveal that they formerly represented all the various stages of the affection, some of them even having had to be brought on stretchers.

With so many cases of the disease staring one daily in the face, and with such a large population formerly, but no longer, the victims of the same malady surrounding him, a physician very naturally inquires as to the character of the influences working together to bring about such results and the clinical types to which the climate holds out the most roseate prospects.

*Reprinted, with permission of author and publisher, from the Colorado Medical Journal for March, 1904.

To one who has lived all his life within 300 miles of the "Mound City" (St. Louis), and for nearly the last 20 years within its confines, the characteristics of the winter climate of Denver and its neighborhood are most striking and agreeably surprising. To such a person a residence near the foothills of the eastern slope of the Rockies is a revelation as to what constitutes a climate to be enjoyed, one which is really a fountain of life to the tuberculous. He soon learns to appreciate the enthusiasm for their climate which is so characteristic a trait of all Coloradoans—native-born or immigrant. Of many it might be said that to be lacking in enthusiasm would be proof of the rankest ingratitude.

The climate of this region has, of course, already been made the subject of many reports of more or less scientific exactness. Nevertheless, if I may judge from my own experience among confreres in lower and less favored regions, its characteristics have very frequently failed to attract the attention due them. Oftentimes, as a necessary result, the value of the climate in the treatment of pulmonary affections—tuberculosis especially—is overlooked. Too frequently the physician, on making the diagnosis, consumption, is led to regard the prognosis as necessarily bad, and to conclude that his patient will do well or better at home; all that can be done is to put off the evil day of death as long as possible, and, as far as lies within his power, relieve the unpleasant traits of the disease which can not be cured. Acting upon this conclusion, the patient is not offered the best opportunity for recovery. On the other hand, it is not to be denied that patients are sometimes sent here who, on account of special characteristics in their cases, would do better in some other climate, or at their homes. They, when sent here, fail to do well; die, perhaps, and the physician, who has really been injudicious, is disap-

pointed at the result of his own error, and the climatic treatment of disease has made an enemy instead of a friend.

The type of the disease, the amount of lung tissue destroyed, the disposition of the patient, his business and social relationships, and his financial condition, all have a bearing on the future course of his affection. The resultant of these forces may, in different degrees, aid, oppose, or even entirely overcome the effects of the most carefully planned climatic or other treatment.

Other things being equal, it is safe to say that the climatic treatment of consumption offers the best prospects of success. For an intelligent application of aero-therapeutics a careful consideration of the diverse properties of the climates of the various regions laying claims to special advantages in that line is absolutely essential. However, inasmuch as the exact scientific data for the climate of Colorado are readily accessible, it is, perhaps, just as well to be sometimes a little less abstruse in the consideration of this subject, and to give expression to the more vivid impressions which have made themselves felt to the individual.

From the mean annual, quarterly or monthly temperature reports of the Signal Service, it is not always possible to draw correct inferences as to whether a climate is mild or severe. For example, the winter temperature for Denver (about 30° F.) passes very close to Topeka, Kan.; Kansas City, Mo.; Springfield, Ill.; New York City, and Boston. The mean winter temperature for St. Louis, Cincinnati, Washington and Baltimore is about 5° higher. It is safe to say that the winter in Denver is vastly more agreeable and endurable than in any of the other cities mentioned. Personal experience has shown me that as regards Denver and St. Louis their climates do not compare—they contrast with each other. In Colorado *we do* not feel the cold as much as we do in Missouri. This

is due not only to the dryness of the air, but also to its diathermancy. This latter quality is so marked that I have repeatedly noted that it is possible to walk about the streets without an overcoat with perfect comfort when it would be freezing briskly in the shade. This is, of course, a matter of great importance in cases of pulmonary phthisis; it permits of a great deal of outdoor exercise which would otherwise have to be omitted.

Even more important is the matter of humidity. Moisture, in an equable, warm climate, is beneficial in certain classes of consumption; in a changeable climate it is distinctly injurious in all types and all stages of the disease, while dryness under exactly similar conditions is not only not negative in its influence, but positively beneficial in all but a very small percentage of cases. A large part of Colorado is blessed the year round with an exceedingly dry atmosphere.

It must be remembered that, for both very high and very low temperatures, a slight increase in the atmospheric humidity renders the weather very much less endurable.

Another subject of great interest is that of winds. During the winter season in Denver, St. Louis and Chicago, the prevailing winds are from the south. In Cincinnati, Philadelphia and New York, they are from the north. Only in Denver do the prevailing winds correspond with those favoring fair weather. In all the others they correspond with those bringing foul weather. With the exception of Denver all the year round, and Philadelphia and New York in the fall, it is only during the spring months that in any of the cities named the prevailing winds favor fair weather, having a direction contrary to those most apt to be accompanied or followed by storms. One result of this, combined with the dryness of the air here, is that in this state there is a very large percentage of cloudless days. Here, during the winter, the

sky is cloudless 66 per cent. of the time. In St. Louis, New York and Philadelphia it is cloudless only 45 per cent.; Chicago only 43 per cent., while in Cincinnati it falls to 38. When we remember that some clinicians assert that the entire beneficial effects of the climatic treatment may be ascribed to the sunshine, to the exclusion of other elements, we must recognize the importance of the preponderance of cloudless days in the Rocky Mountain region.

On account of the altitude (Denver is just one mile above the level of the sea) and the resulting rarefaction of the air, certain other effects are produced. For a short time after coming to a higher plane there is a temporary increase in the rapidity and energy of the heart's action; this, however, is usually accompanied by a lowering of the blood pressure, so that previous hemorrhage is not, as might be supposed, a contraindication to sending cases accompanied by such phenomena to elevated regions for treatment. Later on, the heart's action is slowed, and the lowered blood pressure is again raised. The respiratory act is increased in vigor and depth. This brings hitherto incompletely used portions of the lungs into active exercise and is followed by hypertrophy of normal lung tissue and vicarious emphysema in the neighborhood of the tuberculous lesions (Williams). There is, consequently, greater depth and prolongation of inspiration and more complete expiration. From this a considerable enlargement of the thorax results.

As regards Denver itself, there are to be taken into account the good and evil traits incident to a large city. Denver has a population of 160,000 inhabitants; consequently, we have to a certain degree the results of the assembling of many people at a given center. However, the city is spread out over a considerable extent of space, and building is not as close throughout the entire city as is the case in many other places

of like size. The crowding together of the poorer classes is not so marked, not so intense, as is the rule in other large cities. The streets are wide, and many of them well paved. The character of the soil is indicated by the fact that within twenty-four hours after a severe rain, which is rather a rare event, it is possible to ride the bicycle with comfort anywhere within the city, even over unpaved roads.

The provisions for caring for the sick are good; there are excellent hospitals and sanitaria. Good hotels abound, and the opportunity for obtaining comfort in private families are not few. Board is as reasonable as in any city of the East. In the summer, places for outdoor amusement in the immediate neighborhood and numerous excursions to points of interest throughout the state provide the proper pleasure and relaxation for the invalid able to take part in them.

Summing up the preceding characteristics, we may readily infer the cases of tuberculosis most apt to be benefited by this climate. Of course, incipient phthisis offers the best prospects for improvement or cure. That is true in any location or climate, but especially true in the higher altitudes. It is needless to say that the earlier the stage the better the prognosis. As has already been stated, a hemorrhagic tendency is no contra-indication to treatment in elevated regions. Such cases do well here. The climate is especially indicated in consolidation and hereditary cases.

There are certain cases which should not be sent here; they may be classified as follows:

1. Phthisis florida in any stage. No climate is specific against tuberculosis, and no climate will rescue such cases from inevitable death.

2. Cases in which there is not sufficient lung-substance left to perform the additional work of respiration imposed by the rarefaction of the air. It is estimated that the respired

volume of the air at this elevation must be one-sixth more than at the sea level in order to furnish the same amount of oxygen to the blood. While normally there is considerably more lung-substance than is necessary for the performance of the respiratory function, this gradually disappears with the encroachments of the tuberculous process, and in high altitudes the surplus, being smaller, is exhausted earlier. Cases so affected, if sent away from home at all, should be recommended to a lower altitude than this.

3. Those individuals in whom the character or extent of the pulmonary lesions furnish no contraindication to high altitude treatment, but who are unwilling to submit themselves to the self-control and hygienic conditions necessarily imposed by their condition. Many individuals go to a health resort expecting the climate to do everything for them, and, consequently, yield to imprudences of the most varied kinds, which they would not dream of indulging in at home. They will not do well, and are lulled into a sense of false security by their surroundings.

No patient should be sent away from home on account of this without being referred to some trustworthy practitioner of the locality to which he is directed. As far as possible, chance should be eliminated from further interference with the case. I not infrequently meet individuals whose treatment is still being controlled from a distance by the physicians they were in the habit of consulting at their former homes. These same physicians would not for a moment think of trying to treat a case of pneumonia or typhoid fever a thousand miles away. Tuberculosis, while usually not so rapid in its course, requires no less careful consideration and observation of its progress. Treatment by mail is not in accord with the patient's best interests. The competent practitioner at a health resort of any kind is a far better judge of the avail-

ability of local therapeutic agencies and the modifications most suited to the individual case than any physician possibly can be who is situated at a distance.

In conclusion, I can not do better than quote from the work of C. T. Williams on "Aero-therapeutics," the Lumleian Lectures for 1893. He says, concerning Colorado: "With regard to the actual results of the climate, it undoubtedly produces great improvement in 75 per cent. of the cases of phthisis generally, and in 43 per cent. it causes more or less complete arrest of the tuberculous process."

The foregoing was written in 1897, after a comparatively short residence of ten months in Denver, when the first and striking impressions were still fresh. The facts and conclusions presented therein are no less true to-day than they were when the article was written. Indeed, a continuous residence here since that date has but served to strengthen the impressions then made and confirm the deductions then drawn. Indeed, I am more than pleased to be able to state that a widened experience and observation have added more evidence to the impression then formed, that, for the properly selected consumptive, Colorado is a veritable haven of hope and offers the best opportunities for recovery and prolonged and useful life.

The compiler of this book has spent a number of years in Denver, and wishes to add his testimony to what Dr. Beggs has said as to the attractiveness of Colorado as a resort for consumptives, as well as for those who are in health.

First, as to its climate. This, of course, is Colorado's chief claim upon the attention of the pulmonary invalid. The value of the climate of Colorado in the treatment of tuberculosis is now too well established to require proof and too well known to need advertising, but the delightfulness of this climate is perhaps not so fully appreciated. In this particular

the climate of Colorado can not be adequately described; it must be experienced. And one who would truly know what it means to live in such a climate must not judge from his experience of a few days or weeks. He should remain at least a year, for the climate of Colorado is not monotonous; it is not all sunshine, nor all summer, nor all winter. There are seasons here, and one finds in Colorado, as in the East, those climatic changes which give variety—an important point to be considered, for even sunshine may in time become oppressive, causing one to long for a good old-fashioned storm.

"The climate of Colorado presents delightful seasons the year around. There is no season of the year which one need wish to avoid. So many thousands of people visit the state every summer that it is hardly necessary to dwell upon the enjoyments of the cool, refreshing air of that period. During the summer months the average maximum temperature [at Denver] is about 79 degrees; the average minimum, 50 degrees; the general average, 64½ degrees. The thermometer frequently registers high temperatures, but the fact is hardly noticed, for the reason that the dry, rarefied air causes a rapid evaporation of moisture, which tends to keep the body cool. Perspiration is less troublesome than in lower altitudes, and sunstroke is unknown. Even on the warmest days it is comfortable in the shade, and the nights are always cool and refreshing.

"There is, strictly speaking, no rainy season. March and April are commonly the worst months, and during these there are, in some years, high winds and frequent snow; but, in other years, it is dry and bright, except for occasional brief spells of disagreeable weather. During the summer months afternoon showers are frequent, but they are short and often so slight as to receive very little notice. From September to April, there is, as a rule, no rain and but little snow. It is

seldom that snow lies on the ground for more than a day. Of course, it must be understood that these are the conditions found in the lower and less exposed portions of the state, for, on the higher plateaux, all degrees of winter rigor may be experienced, culminating in the perpetual reign of ice and snow on the mountain peaks.

"During the winter months, the thermometer occasionally goes as low as 15 or 20 degrees below zero, in some of the lower localities; but this is rare, and even then, the succeeding day is apt to be bright and warm. The winter months are a season of almost uninterrupted sunshine, and the air is sufficiently warm for the enjoyment of riding, driving and the more vigorous forms of outdoor sports. The only disagreeable feature really worthy of notice is the prevalence, at times, of wind and dust, and it is probably well that these should receive some mention, as the account of them is sometimes exaggerated by those who visit the state, expecting to find an absolutely perfect climate, at all times. It should not be pretended that Colorado is the Garden of Eden or 'Paradise Regained;' but it is right to say that it has the most healthful and pleasant climate, for residence, the year around, that can be found in the world. The wind is, in fact, much less than in many other favored sections of the country."*

But however attractive Colorado's climate may be, it is perhaps true that a climate equally good for the tuberculous invalid may be found in several portions of the country. There is, however, one respect in which Colorado has more to offer than any other resort, with the possible exception of southern California. Colorado is more than a health resort—it is one of the most attractive states in the Union as a place of resi-

*Condensed from an attractive booklet, "Colorado, Its Climate," issued by the Colorado Promotion and Publicity Committee. Denver, Colorado.

dence. People go to the deserts of Arizona and New Mexico in search of health alone, while thousands of persons in the best of health come to Colorado from other states seeking their fortunes and a home. For many persons who have recovered from tuberculosis in a favorable climate, it is unsafe to return permanently to their original homes, and to these it is of the utmost importance to select a place in which they may hope, after being cured, to make a living for themselves and families and enjoy a comfortable home. Colorado is pre-eminently such a place. It is an inland empire, as yet largely undeveloped, affording opportunity for success in almost every occupation. The material advantages of the state may be learned from the voluminous and attractive "literature" issued by the various railroad companies, and need not be exploited here.

There are some practical suggestions to be made with reference to coming to Colorado. In the first place, do not come unless you possess sufficient means to live comfortably without working until you get well. Denver is crowded with invalids, or persons coming with invalids, who are eager for employment at almost any price, simply for the sake of remaining in this climate. Climate is only one factor in the treatment of tuberculosis. Bodily and mental comfort and proper nourishment and attention are even more important, and unless you can procure these here you had far better remain at home, where they can be had at less expense. Again, if you come to Colorado, do not expect the climate alone to cure you. If you rely upon the climate here rather than upon a proper mode of life, you will probably not recover. The writer has known many consumptives well enough to attend to business, who continued to live in Denver as they had done in the East, relying upon the climate to cure them, and who steadily declined in health and finally died. A proper mode of living here, as well as in the East, is essential to success. Dr. Beggs has urged

the importance of promptly consulting a local physician. It is better, as he suggests, to be directed to one by your home physician. In this way you may be more certain of finding one both competent and honest. In Denver, as well as in other places, it is possible to make a mistake in this respect.

There are several excellent sanatoriums at Denver and in the state, one of which—a tent colony—is maintained by the Young Men's Christian Association of Denver. Tent life is very popular, and many tents will be seen scattered in the yards of the cities. Porches so constructed that one can sleep out of doors, winter and summer, properly protected from the elements, are also very common.

The new arrival should be careful not to overexercise at first. The bracing atmosphere of this high altitude is so exhilarating that one is tempted to overtax his strength by too much walking or other exercise, and this, of course, is dangerous to the tuberculous invalid. Fatigue should be carefully avoided. For this reason "roughing it" in the country is not advisable, and it is better to go to a good sanatorium or live quietly on the outskirts of Denver or in the smaller places, where proper food, professional attendance, and other necessaries may be procured.

THE CLIMATE OF SOUTHERN CALIFORNIA WITH REFERENCE TO PULMONARY TUBERCULOSIS.*

By GEORGE E. ABBOTT, M. D., Pasadena, Cal.

In discussing the climate of southern California, from the standpoint of the climatic treatment of tuberculosis, it is very easy to indulge in superlatives and still be well within the bounds of the truth. But as physicians and patients alike seek anxiously for facts and not for exaggeration, I shall at once meet them on the plain, answering imaginary questions in a practical, rather than a scientific manner for the sake of the health-seeker and his physician.

Southern California is not a "perpetual spring," as our railroads advertise it. It is a great deal better. It is a perpetual fall, an everlasting September and October of New England. We do not have the hot, muggy, humid climate of Florida, but the clear, cool air of a New England fall. The sunshine is hot, the air cool, not cold. Standing still in the sun one is too warm; step five feet into the shade and one is a little too cool; working and walking one feels just right. For this reason patients should bring their warm clothing. Our nights are always cool. A winter overcoat is often very comfortable when riding in the late afternoon or at night, just as it is in New England after a warm October day. In the

*Reprinted, with permission of author and publisher, from the Colorado Medical Journal for March, 1904.

East men go out without coats and work in their shirt sleeves in September and October. Our men do this the year around.

Our "rainy season" is a misnomer; we have nothing like the rainy season of the tropics. The "rainy season," so-called, is merely the time when the rains come, now and then, here and there, from December to April. It rains in southern California just as it snows in New England. Between the rains are the brightest, happiest days of all the year. We do not have rain enough, and from May to December we have hardly a rain storm. Day after day, week after week, there is no rain at all, but the days are bright and clear the summer through.

Some tire of this perpetual sunshine, but not the tubercular patient. The relief to the kidneys and lungs by the comfortable activity of the skin is a great blessing to them. Those of us who live here enjoy the summer even more than winter.

Is the climate enervating? No, not in the least. It is somewhat more monotonous to those who have nothing to do, but the active man can do more here than in the East. And the tubercular patient must have something to do—bodily temperature permitting—if he would get well. He must *"work out his salvation"* physically, as well as spiritually. If he seeks a cure, he must plan for it as he would for a college education. One can not secure a college education in two months or even a winter's course. Neither can one secure physical health in the same time. Let the tubercular patient plan for a two or four years' health course, and he will graduate a physically perfect man.

Many physicians and most patients think that climate is composed of clouds and sunshine, thermometers and barometers, wind currents—especially drafts—and rainfalls. One of the greatest factors of climate, as applied to the tubercular patient, is the geological structure of the few acres of ground

upon which he lives. The under-ground climate is often of more importance than that above ground.

If the subsoil is a cold clay or hard pan, full of water, to within a few feet of the surface, the patient will forever be chilly, catarrhal and rheumatic. If, however, it is a warm, well-drained, sandy and gravel subsoil, the patient will be warm-limbed, non-catarrhal and well nourished, if he will eat and exercise.

Almost all of the southern California towns and cities have geological foundations of mountain waste. Almost all of the San Gabriel valley, wherein Pasadena is located, is of this character. One must dig down from 50 to 200 feet through fine and coarse gravel before reaching water-bearing gravel. This makes Pasadena a town of unusual healthfulness, and the same is true of the majority of southern California places.

Elevation.—The elevation of southern California cities is all the way from 10 to 50 feet, at Coronado and other seaside places, to 1,000 or 2,000 feet in the foothills, and one can secure almost any elevation desired except very high altitudes. One may breakfast at Coronado, lunch at 1,700, and dine at 3,000 feet elevation. The same is practically true of Pasadena, Los Angeles, Redlands, and Riverside.

Hotel Accommodations.—Within six years I was written to by a friend in the East, asking me what hotel accommodations we had out here, saying, "My wife is in delicate health; can I take her with safety to southern California?" He was very much surprised when I sent him the menu and circulars of hotels from four of our cities, showing him that in each place he could have quite as good accommodations as at the Murray Hill or Fifth Avenue Hotel in New York City.

All of these considerations enter strongly into the question: Shall I send, and shall tubercular patients and their families go, to southern California?

It should be remembered that our Southern California Home, including Santa Barbara, Pasadena, Los Angeles, Redlands, Riverside, and southward to San Diego and Coronado, is, as it were, a climatological peninsula, having the boundless cool Pacific on the west and a great inland desert on the east. Across this area of land the winds pass and repass; their coolness and heat, moisture and dryness, are mixed and tempered as, probably, in no other climatic region in the world.

I feel that it is all wrong to send advanced cases away from home. My experience also tells me that it is all wrong to keep primary cases at home.

It is difficult for the tubercular patients to secure home and employment here. They should therefore have sufficient funds to carry them for six months or more without labor, and they should also come with a friend or friends, if possible.*

The neurasthenic and invalids other than tubercular are much more cordially welcomed by those who provide homes for others, and certainly reap even a larger benefit from the genial climatic conditions of southern California.

THE FOOT HILLS OF SOUTHERN CALIFORNIA.†

The lot has fallen to me to give you some of the conditions observed in the foothills of southern California.

First, it must be remembered that there is a vast difference between the *foot of the hills* and *the foothills.*

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*The secretary of the California State Board of Health writes to the compiler of this work that the almshouses of the state are crowded with poor consumptives who have been unable to secure employment. Patients without means should remain at home, where they will have a better chance of recovery.

†The remainder of this article is taken, with the author's permission, from a paper read by Dr. Abbott before the American Climatological Association in 1902.

The foot of the hills always carries with it a background of high altitude, with its cold night air, whereas, paradoxical as it may seem, there may not be any hills in the foothills, but rather large areas of table or mesa lands.

As a rule, however, there are, of course, small hills upon these mesa lands, which lend all the more attractiveness to the well and especially to the invalid. Let us agree, then, that the foothill shall comprise an altitude from one to two or three thousand feet elevation.

From the various scientific and popular articles upon climate which we read, one would judge that the majority of physicians and others think that climate depends entirely upon air, at rest or in motion, sunlight, temperature and electricity, clouds, etc., the proximity of mountains and the sea.

It is one of the purposes of this paper to show that it depends, as you all well know, largely upon geology as well. That the earth structure of the patient's residence has very much more to do with his recovery than the latitude and longitude of his dwelling house.

If in one community a majority of the people are constantly chilly, catarrhal, rheumatic and poorly developed, while in another they are as constantly warm, free from catarrh, have no rheumatism and are well developed, I believe we will all admit that, other things being equal, there must be a marked difference in the climate of the two places.

On the banks of the Hudson river, midway between the cold trap-rock region of the Catskills and the warm, sandy areas of New Jersey, is a little town in which there are two houses, just one-half mile apart, having the same air, sunshine, temperature, humidity, clouds, electricity, etc., but with an entirely different geological foundation and an entirely different "climate."

The first is situated upon a cold, slaty subsoil. If one sits upon the grass of a summer's evening, he rises in twenty minutes, chilled and stiff. The family are always catarrhal, rheumatic, chilly and half sick.

The other home is located lower down and nearer the river, but on a large, sandy and coarse gravel bluff. The well had to be dug sixty feet before reaching any water-bearing strata. One may camp all night here, sit on the grass and watch the tennis and croquet, with impunity. The members of the family are always well, free from colds, catarrh and rheumatism. When the first family spends a few days with their cousins, they immediately begin to improve in health.

The pictures I have drawn of these Hudson River homes is largely typical of our high mountains and of our foothills. The mountains are, as a rule, cold, rocky regions, and in consequence of mountain fires, they are barren, their canons barren and deep. Ages since, their lofty peaks, thousands of feet higher than now, were tumbled into the broad valleys, so that at present the dwelling places of our foothills have a most desirable subsoil of mountain waste from twenty-five to three or four hundred feet deep. This is especially true of the entire area of Pasadena, largely so of Los Angeles, and of the whole foothill region of San Diego county. Aside from this, the conformation of the foothills gives perfect surface, as well as subsoil, drainage.

This, then, is the fundamental reason of the desirability of the larger valleys and mesa lands of our foothills, not merely a small area for one home, but thousands of acres for large communities.

The heart and lungs combine in rejoicing in our foothills. Many a patient is sent to a high altitude with instructions to lie down and rest, and keep as quiet as possible the first few days, but the poor laboring heart cries out for rest, but can

find none; it must contract, and rapidly at that. The demand upon it is enormous and continual, but there is no rest except through muscle poisons and drugs: the same is true of the weak, disabled lungs.

At the foothill altitude we escape this excessive heart strain, and patients of all classes find a most delightful pleasure in riding and walking over the slight variations found in roads and trails. My belief is that in after years we will send more of our invalids to the foothills and more of our convalescents to the high altitudes.

There is another feature of our foothills not found in the eastern foothills. It is what is known as the frostless belt. In the deep, still valleys we have killing frosts, at times, during the winter. The same is true of some of the high hilltops, but between these points there is a broad frostless belt—all along the hillsides and mesa lands—where there are no killing frosts from year to year.

You will observe that I say "no killing frost." Here again is a distinction; we may have hoar frosts and even frosts sufficient to destroy the more tender plants, such as the tomato vines and heliotrope, but not sufficient to destroy our citrus trees or to produce serious colds for our invalids, or the majority of our plants. These frosty nights are only at long intervals even in the winter, and are entirely unknown during the majority of the year.

This frostless belt is of great interest to the horticulturist, but what does it mean to the climatologist and his tuberculous patient? I believe that within ten years it will mean the difference between life and death to hundreds of invalids.

The key to health and the watch-word of the future invalid must be "never breathe the same air twice." In this frostless belt one may sleep in the open air at night and exercise with coatless freedom during almost the entire year.

This, then, is what our frostless belt of the foothills means to the health-seeker of southern California! As to humidity, allow me to quote from Mr. Ford A. Carpenter, of the Weather Bureau of San Diego. He says: "Nothing so clearly illustrates the local character of the climate of San Diego as the humidity. While the mean annual relative humidity is 78 per cent. at the weather bureau station, two miles north, and at an increase of 200 feet in elevation, the humidity decreases 15 per cent. Five miles away, and at an elevation of 300 feet, there is a further decrease of 5 per cent. The temperature is, of course, proportionately higher."

The maximum amount of sunshine occurs in November and the minimum in May and June, the winters being clear and warm and the summers cloudy and cool. A photographic recorder installed in 1890 showed an average of but three days per year without sunshine What is true of the middle ground of altitude between sea-level and the high mountains, is also true of fog and cloud. The foothills largely escape the low, chilly fogs creeping in over the surface of the ground. They quickly lift into scud clouds and float over us high above our heads.

These cloudy days, which occur in May and June, are apt at first to make patients depressed, blue and melancholy, but when they recognize that it is the same kindly hand that made the genial climate, that spreads out the clouds like an immense umbrella over the southern California hills to protect man and beast as they toil in the fields, to cut short the heat of the day and prevent the constant evaporation, they become glad at heart.

Notwithstanding our warm, genial winters, our summers are not hot, but almost as cool as our winters; in fact, the average Californian enjoys the summers more than the winters. It is the best part of the year, and I can vouch for the fact,

after a four years' residence at Coronado Beach, that *it*, as well as the beaches of Los Angeles region, are much cooler and more delightful than Newport, Narragansett Pier or any of the Long Island or New Jersey summer resorts.

We must remember that southern California is a climatological peninsula, projecting southward, surrounded by a boundless ocean of cold water on the west and an immense sea of hot sand on the east. Across this strip of country the air ebbs and flows, the cool sea breezes during the hot days and the warm land breezes during the nights just reducing them from cold to cool.

Much of interest is to be observed and recorded as to the topographical influence of our high, precipitous mountains hedging in the hot desert sea, while their western hillsides slope gradually to the ocean, giving our foothills the advantage of the very best attack of the sea breezes, while the hot desert air is held back as by a dam at night.

I can but say that aside from all the other factors that go to make up climate, the patient's mentality is one usually overlooked, and nowhere can one secure such a delightful mental environment as in the foothills of southern California. To the convalescent such communities as Los Angeles and San Diego, or, even better, Redlands, Riverside and Pasadena, are exceptionally agreeable; while to the "shut-in" and bedridden invalids the view from many a piazza and bed-room window of our beautiful valleys and foothills gives them a never ending and ever varying panorama of beautiful change almost never the same two hours of a day, or two days of the week.

Of all the climates of the earth with which I am acquainted, or of which I can learn, the climate of the foothills of southern California is by far the best. However, we urge you not to take our word for it, but to come out and live with us and study and enjoy it for yourselves.

THE EFFECT OF THE CLIMATE OF THE ATLANTIC COAST ON PULMONARY TUBERCULOSIS.*

By GUY HINSDALE, A. M., M. D., Hot Springs, Va.

Fellow of the College of Physicians of Philadelphia; Late President Pennsylvania Society for the Prevention of Tuberculosis; Secretary of the American Climatological Association; Member of the American Neurological Association; Fellow of the American Academy of Medicine.

The relation between the Atlantic Coast and the development and progress of pulmonary tuberculosis has not been fully understood. It is commonly associated in our minds with a greater prevalence of the disease and as an unfavorable locality for its successful treatment. We know that it is moisture-laden and wind-swept. From Hatteras to Cape Ann and Eastport it is subject to great vicissitudes of wind and weather, as many a sailor knows to his sorrow.

The Atlantic Coast may fairly be taken to include territory up to a hundred miles back of the shore line. Geographers may give it wider limits according to their point of view. We may properly include all the territory that is dominated by oceanic as contrasted with continental influences. Maine differs greatly from Florida, as Massachusetts differs from Virginia; but whatever differences of annual temperature exist between the extremes of the seaboard, the common factors are a very small daily range of temperature, large movement of

*Reprinted, with permission of author and publisher, from the Colorado Medical Journal for March, 1904.

mountain rising to the north and northwest some 600 or 700 feet above. The sanatorium commands a superb view of the valley of the Lehigh river. It is entirely free and is generously aided by the state of Pennsylvania. All the permanent buildings have been erected by means of the state appropriation.

But I am perhaps asked, What has this to do with the climate of the Atlantic Coast? Only this, that the climate of the Atlantic Coast is conducive to energy; energy produces wealth and fosters philanthropy; philanthropy provides suitable accommodations, unlimited milk, butter, eggs, wholesome meats and vegetables, clothing, medical attendants and nurses. The final result is a cure in a large proportion of cases of consumption.

That such results can be obtained on the Atlantic Coast will no doubt surprise our Rocky Mountain friends, who believe that they have a most powerful ally in climate. So they have, but the ally needs to be directed to accomplish the end in view. The best climate in the world, without *regime,* is as "sounding brass and a tinkling cymbal." It is the man behind the gun to whom honor is due; so it is the man behind the climate, utilizing every natural aid, directing every hour's employment, inspiring confidence and active co-operation, teaching daily lessons of self-control and determination to get well—that is the kind of man who succeeds on mountain or the plain, the desert or the seaboard.

The second institution whose work I wish to put on record is known as Pine Ridge camp, at Foster, Rhode Island. It is the latest candidate for honors in the growing family of sanatoria. It is of necessity nearer the seaboard than most of these institutions. It is not endowed nor does it command a rich support. That the climate of Rhode Island is modified strongly by the proximity of the ocean, by deep bays which penetrate the state, has not discouraged the originators of this

movement. The camp was opened about a year ago and the results have fully warranted the measures. The moral courage displayed by Dr. W. H. Peters and Dr. Jay Perkins, who have preached the necessity of such an institution, whatever the climate might be, and did not hesitate to go ahead, is certainly admirable.

The accompanying views show the character of the camp. The distinguishing feature is the use of inexpensive shacks or

A "Shack" at Pine Ridge, R. I.

cabins, accommodating two patients each and provided with ample means of ventilation. By means of a small stove sufficient warmth is maintained in severe weather. The views were taken in January, 1904, at the time the camp was visited by Dr. Richer of Montreal, Governor Garvin of Rhode Island and others. Dr. Peters had adapted disused trolley cars for camp purposes and thereby has made a contribution to the economy of sanatorium management. These old cars serve a useful purpose. They have good roofs and plenty of win-

dows, and are very much appreciated by the occupants. The smaller views were taken when the temperature was 20° below zero. The cost of the shacks is about $150. There is every prospect that if a proper dietary is maintained as good results will be obtained here as at Rutland, Sharon or East Bridgewater, Massachusetts.

In a study of the distribution of pulmonary tuberculosis in the state of New Jersey, I found that Ocean county and

Twenty Below Zero, Pine Ridge, R. I.

Monmouth county are far more free from the disease than counties like Hudson, Essex, Mercer and Camden, which lie at greater distance inland. Studies of this kind invariably show that economic factors, like density of population and the less healthful occupations, have more to do with the disease than purely climatic influences. That is a most encouraging point, for economic difficulties may be overcome. The fact is, there is no *best climate for the disease,* but, on the other hand, *there* is often a *best place for the patient.* His particular needs,

his strength, his fancies and his pocketbook have great weight on the choice of a resort. There is no doubt in my mind that the mountains of New York, Pennsylvania, Virginia and North Carolina offer many advantages in treating consumption as compared with the seaboard, because our-door life throughout the year is more interesting and patients must have a variety of diversions. They would, no doubt, do equally well in the sand belt of New Jersey, but the monotony of life might discourage many whose interest in a climatic cure would be maintained easily in a mountain resort.

"I will look unto the hills from whence cometh my help." That strikes the keynote of climatic treatment.

WHEN SHOULD THE TUBERCULOUS PATIENT BE SENT FROM HOME?*

By CHASE P. AMBLER, M. D., Asheville, N. C.

The beneficial influence of change of climate to patients suffering from pulmonary tuberculosis has from ages past down to the present time been recognized as the most desirable and beneficial procedure for such patients to follow. Those advocating the most modern ideas, so far as medicinal treatment is concerned, are generally free to confess that this remedy or means will be more effective under favorable climatic conditions, in conjunction with outdoor life and strict observance of hygienic measures. That the disease is curable is no longer doubted. True, for centuries the laity and many physicians have considered this disease fatal, but this has resulted from the fact that, up to within very recent years, the disease was rarely recognized before the patient had advanced to such a point that a recovery was out of the question. Statistics now show that the great majority of those who contract the disease recover without ever becoming aware that they have been so afflicted. Natural resistance brings this about, frequently under the most adverse unsanitary and unfavorable climatic conditions.

Physicians at resorts are invariably struck with the fact that the great majority of the persons who consult them on

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account of a tuberculous trouble are far advanced in the disease, and in a hopeless condition. The great majority are also poor; poor, because during the last year or two their earning capacity has been greatly lessened; they have hung on to their work from necessity, and have finally only left home as a last resort, with death staring them in the face, and on being advised that "a change of climate is their only chance." The inconvenience, suffering and deprivation to the poor thus afflicted and sent from home are certainly too often not thoroughly considered by the home physician. A change of climate may offer hope where otherwise none exists, but in the advanced cases the same money spent judiciously at home in a rural district, with good food and attention, would undoubtedly offer more encouragement than separation from home and friends, a life in a cheap boarding-house, and the lack of home comfort, attention, unkindness, and the anxiety arising from financial matters.

Tuberculous patients should always, no matter whether they remain at home or are advised to change climate, receive the most painstaking instructions in regard to their disease and the requisites for recovery. They should be told the truth at home, and not left to find it out for themselves after leaving their friends. As a rule, the patient knowing least about himself and his disease, the one who has had practically no instruction regarding his hygienic life, has been told that all he needs is "to go to Asheville and let the doctors alone." This is certainly dangerous advice, for the reason that the physician at home is not able to foretell exactly what change of altitude, for instance, will result in. Many a patient blindly follows such suggestions on the part of the home physician (in whom he may rightly and naturally place the most implicit confidence), and ruins his chance for improvement or recov-

ery by following a course which, could the home physician have foreseen the result, would never have been outlined.

What Patient Should Be Sent Away.—It is in the beginning of the disease that a climatic change is most beneficial. We speak of cases in the "early stages," as though that was some clearly defined condition; whereas, in fact, a patient may have tuberculosis for years and still be in much better condition than another who has been infected only a few weeks. Generally speaking, by "early stage cases" is meant those who show but slight physical signs and whose symptoms do not indicate a rapid advancement or a septic condition.

If destructive processes have progressed in the lung to the point where cavity formation can be detected, great care should be used in advising the patient to leave home. Particularly if high temperature (101° F., or over, as a daily maximum) is present, is this true. In such cases a few weeks' rest in bed at home, preferably in the open air, will see a marked improvement in the general condition. If the patient is sent to a resort and improvement is to follow, the same procedure will in all probability have to be carried out there. It is preferable, therefore, especially where the patient can not, on account of money matters, have away from home the care and attention he needs, that this high temperature (meaning active disease process) should be reduced before the patient leaves home.

It is a mistake to hurry the patient away from home in a day or two following hemorrhage, particularly on a long journey or one that carries him to a high altitude.

Weight.—Our records show that where the disease has advanced to the point that the patient has lost one-third in weight, it is in the rarest exceptions that recovery follows, and but a small per cent. of such patients make any permanent improvement.

Intelligence of Patient.—The adage, "Where ignorance is bliss 'tis folly to be wise," does not apply to tuberculosis, in any case. The strongest point for recovery is a full appreciation on the part of the patient for the dangers that are ahead of him. If his mental calibre is such that he can not be made to appreciate the necessities as laid down, then he should not be allowed to leave home alone. Again, thoughtlessness, carelessness, and indifference are equally bad with, if not worse than, stupidity. Some patients must have constant supervision. A tractable patient with marked tuberculosis has many more chances for recovery in his favor (other things being equal than has a thoughtless or careless patient with ever so slight an infection.

Financial Condition.—No patient with pulmonary tuberculosis should be sent far away from home and friends, unless his financial matters are so arranged that he does not for months to come have to work to pay his expenses. Many, many poor patients are continually arriving at our resorts who have practically spent their all on their railroad fare; arriving under the fond delusion that they will find employment at once and be able to support themselves. The large number of persons seeking employment at resorts makes wages very low; too low, in fact, for a person to secure good board on his wages. Many persons who are well accompany their sick friends, and these well persons in many instances are willing to work for half or a third of what their work is worth, simply in order to be doing something to help pay their expenses: Result—the healthy get the preference, and when the poor patient does secure employment his overexertions do not net him sufficient remuneration to meet his actual necessary expenses.

It is the members of this class that break down and develop complications that put them to bed; matters only go

from bad to worse; they are unable to procure the attention of nurses; frequently can not even buy the necessary medicines, and, as no municipality, county, or state provides for the care of the indigent poor from other states, their condition is indeed pitiful. To be sick is hard, to be sick and poor is doubly hard; but to be sick, poor, and away from home and friends and state charity is something that all physicians should thoroughly consider before saying, "A change of climate is your only chance."

Where Should the Patient Go?—In a large country like ours it is amusing to hear the advice that has frequently been given patients regarding dress, climate, and outdoor possibilities. Many persons come to Asheville expecting to hear the birds sing and see the flowers bloom all winter. We have a good all-the-year-round climate, and the latitude is "south," but the altitude necessitates practically the same clothing as that required in New York or Ohio. Our weather is bracing, however, and with little snow. Our patients live out of doors in winter, but they do not wear summer shirtwaists in winter.

Hemorrhagic patients should, generally speaking, not go to an altitude of over 3,000 feet. Heart complications should, of course, always receive careful consideration.

In advising a patient to leave home for climatic change, the physician should not only consider the altitude, but should be sure that the patient will receive the same general conveniences that have been enjoyed at home. Board, sanitary measures, pure water, food, companions, amusements, temperature, rainfall, sunshine, snowfall, and many other points should be considered. The patient should never be sent to a small place with which the physician is unacquainted. There is no place in this country to-day which offers what a tuberculous patient should receive, about which the physician can not acquaint himself in a few minutes' time.

Sanitariums or Boarding-houses.—The sanitarium probably offers the greatest hope to the average patient, and is certainly much the better place for those hard to control. The majority, however, from necessity and choice, will seek a boarding-house. The selection of such a house should be left to the medical adviser at the resort. It should be a place that is kept clean; furnishes a good table; has plenty of grounds; practices fumigation after the departure of every guest (a board of health procedure in Asheville), and carefully insists upon the compliance with a prepared set of rules regarding all sanitary and hygienic measures. The patient should be in a house where he is among his own class socially.

The congregation together of a number of patients in a sanitarium or carefully conducted boarding-house is preferable to allowing the patient to enter a house where no regard to sanitation or hygiene prevails. These patients learn from one another, and, in fact, gain from being so situated. The education acquired as to the necessities for recovery in such an institution is among the most important parts of the treatment of a case.

What Can Climate Do?—The benefit to be derived from change of climate can be summed up in "better nutrition." Improved nutrition means better blood, and favors repair of any diseased organ.

What Climate Can Not Do.—A change of climate can not close pulmonary cavities in a few weeks or months; can not remove old, cheesy deposits, or absorb purulent effusions, or overcome sepsis, tuberculous ulcerations, or proliferations in a few days, weeks or months. Nature does heal all these, but such results are brought about slowly.

When Should the Patient Return Home?—If improvement or recovery occurs, every endeavor should be made to

remain in the region where such improvement has been brought about. Months should certainly elapse after all signs and symptoms have subsided before the patient should consider the advisability of returning to his old home; and for a year or two he should, following his return home, be examined occasionally by his physician.

RESIDENCE TREATMENT IN UNFAVORABLE CLIMATES.*

By JOSEPH EICHBERG, M. D., Cincinnati, Ohio.

Even in localities less favored by nature with what are considered to be advantageous conditions, the treatment of tuberculosis may be conducted satisfactorily and often with complete success.

For this addition to clinical knowledge we are indebted almost wholly to the establishment of the sanitariums; notably to those of Falkenstein and Nordrach. The results here obtained were thought to clearly prove the necessity of the sanitarium in the proper management of pulmonary tuberculosis; but what actually happened was, that the careful observation of the means employed in the sanitarium treatment led to the adoption of similar measures, as nearly as they could be carried out, in the patient's own home; with the gratifying result that here, too, the great scourge could be checked, controlled, and often so far eliminated as to permit the victim to resume his place in the active life and work of his community. There have been more brilliant and more striking triumphs, because the action of certain remedies was more prompt, and the improvement followed quickly and certainly; there has been none more important, or which is likely to be as far reaching, as the proof that tuberculosis was *everywhere* a curable disease.

*Reprinted, with permission of author and publisher, from the Colorado Medical Journal for March, 1904.

The value of the discovery lay in its import to the working community; for, taking it by and large, the principal factor in swelling the percentage of tubercular patients will be found in the ranks of the toilers, the wage-earners, those to whom the struggle for existence is something more than a scientific catchword, and to whom change of climate or ideal conditions are alike impossible. And because of this fact, and because the physician must here combat not alone the disease, but ignorance, carelessness, want, bad sanitation and improper surroundings, his problem becomes infinitely more difficult, yet not hopeless.

The sanitarium has proven beyond doubt or dispute, whether in a favored or less suitable climate, that it offers the patient a much better chance of definite recovery than he could find under the same climatic conditions in his own home; but this does not preclude his making the best of such home conditions as can still be brought to aid in the fight. And a knowledge of this fact, and a firm belief in the possibility of really achieving something, will best qualify the physician to deal successfully with cases at home, under many adverse influences. It will be conceded without debate that for the vast majority of those afflicted with pulmonary tuberculosis there is no possibility of change of climate; not even of obtaining the benefits of sanitarium treatment, for the capacity of the sanitarium is limited.

Legislation is doing much in the way of conducting special hospitals for the consumptive at public charge; but even here the benefits can be reaped only by a few, an inconsiderable fraction of the entire number. For the large number, then, who can neither leave home nor find shelter in a proper charity, what has medicine to offer?

The lesson of the sanitarium was that in the successful treatment four particular features were of primary and equal

importance—physical rest, peace of mind, an abundance of fresh air and a superabundance of good food. It is difficult to grade these in the order of their relative importance, since inattention to any one would often neutralize the benefit obtained from all the rest; but perhaps it would not be a mistake to assign the first place to fresh air. The great prevalence of tuberculosis in institutions, such as convents, in the ranks of those whose pursuits are wholly sedentary, as in book-keepers and the office force, who breathe and rebreathe the same air, would in itself call attention to this as a causal factor; but the therapeutic results obtained with unlimited supply of fresh air, even at very low temperatures if need be, and in the midst of crowded cities, furnish one of the most brilliant triumphs of treatment; so convincing that, once the dread of taking cold is overcome, the patient himself becomes its most ardent advocate.

Let it be understood that the air for the tubercular patient must always be the air from out of doors, admitted directly and freely into his living room; soot-laden air, charged with dust, dense with fog, it may be, yet it is infinitely preferable to the rebreathed air of the closed room. This for the city dweller in crowded districts.

Where the patient occupies a suburb, or better, lives in the country, the problem at once simplifies itself, for then the patient practically should live out of doors, occupying a porch in the daytime, and having the windows of his bed-room wide open at night. He may, for the major portion of the year, sleep out of doors, with no roof above his head, simply placing his bed on the veranda; and here, except on rainy nights, with the dome of heaven for his canopy, he will soon learn to pass restful and refreshing nights. The experience in Manchester has shown that neither altitude nor germ-free atmosphere are indispensable factors in the successful management; and many

cities, under climatic and hygienic conditions the most adverse, have furnished evidence of the curability of tuberculosis, if due regard be paid to the necessary features of treatment. It is desirable that the porch, veranda or window of the sick-room should face the sun, and the sun bath is to be such in a literal sense. The brightness and good cheer, the grateful warmth when fully exposed to its rays, even during the colder period of the year, all have a moral influence not to be despised.

Difficulties will be encountered in securing adequate access to fresh air, particularly in those cases where the family is restricted to one or two living rooms. But tenements are now controlled by municipal supervision, and it need not be an impossible matter to find such a one with veranda, in which case the veranda may constitute the living apartment of the patient, both in his own interest and that of his family. Air, fresh air, and more air should be the first demand of the physician. Despite deep-rooted prejudice against the danger of taking cold—sure to confront him at the outset—he will soon receive valuable support from an unexpected side. The patient himself, quickly realizing the difference in his own comfort, will become the doctor's ally, as soon as the first few days are passed. Firmness, tact, persuasion, diplomacy, must pave the way for the object lesson. The sense of well-being, the freedom from the wonted heaviness and oppression about the chest, the consciousness that life-giving oxygen is finding its way, in adequate amount, into the economy once more, the ability to breathe deeply and freely, and the prompt and striking gain in ability to sleep and eat, make of the patient an ardent convert.

On the subject of physical rest, little need be said. Tuberculosis is a wasting disease, a phthisis. It is a self-evident proposition that a business whose expenditures exceed the in-

come must, sooner or later, face inevitable bankruptcy. The tuberculous patient is under a constant strain; he must restrict his physical expenses, while endeavoring to add to his income. Muscular exercise, with its many advantages for the healthy, simply exhausts more rapidly the narrow margin of reserve; this is particularly true in the febrile period, and absolute rest must be enjoined. This is ordinarily less difficult to enforce than the regulation regarding fresh air, but many have acquired the mistaken belief that exercise increases the power of resistance, weakened by the chronic trouble; and, if unchecked, will foolishly thus increase their tissue waste. The Nordrach rule, that absolute quiet should be enforced so long as there is any fever, and that the earlier efforts to re-establish a life of some activity should be controlled by the thermometer, will be found most advantageous. The patient can soon learn to take his own temperature, and should record it every three hours. The amount of exercise can be gradually increased, provided no fever follows.

On the same economic principle of the necessary balance between income and expenditure, the practice of forced feeding finds its vindication. Valuable under the best conditions, the ingestion of more food than the patient wants becomes more imperative where the obstacles to recuperation are greater. Ordinarily the raw egg treatment meets with the least opposition, and the number of raw eggs may soon be brought up to an average of one dozen daily, taken between the regular meals, or in addition thereto. In the country the supply of fresh eggs can be easily obtained; in cities some caution is necessary, for a spoiled egg, or one that has been limed, may excite nausea or permanently prejudice the patient against this useful form of alimentation. Fever is no contraindication to forced feeding. The appetite may be stimulated by relishes of various kinds, and some regard must be paid to the patient's

preferences. Any plain, simple foods, fresh meats in particular, cereals, green vegetables, fruits and some sweets may be permitted; indeed, short of articles known to be unsuitable, such as pastries, rich sauces, fried dishes and dressings of various kinds, no limit need be placed. The object aimed at is to overfeed the patient, without, however, causing the stomach to revolt. Food should be given often, in relatively small quantities. Practically the tuberculous patient, unlike his healthy brother, lives to eat.

The anorexia [want of appetite] of phthisis may offer a serious problem; but the constant stay in the fresh air will stimulate the appetite more satisfactorily than all so-called stomachics; and persistence in the forced feeding, even though vomiting be occasionally induced, will speedily establish first a tolerance and later a positive craving for food. Both quality and quantity of food are of importance—no effort should be spared to make the dishes palatable, and the table should be supplied with the best the means will allow. Wine or other alcoholic stimulants, in small quantity, may be added to the meals, if better appetite can thus be secured.

Mental anxiety of any kind, the strain that ofttimes attends the patient's participation in the *res angustae domi,* is an unfavorable feature; every effort must be made to maintain an atmosphere of cheerfulness, of hope, of contentment, in which the patient shall find solace for existing ills and comfort for the future.

In all his dealings with the patient the physician can expect to be successful only if he bring to the task a sincere conviction of the truth of his cause. "Thrice is he armed that hath his quarrel just"—in the struggle with the disease itself, with the apathy of the patient, and with the declared hostility of family and friends, this must be his reliance, that he hath *his quarrel* just; and through him the patient must be keyed

up to the high moral plane of determined and unremitting effort in his own behalf.*

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*Purposely, no statistics have been introduced; the mention of a single case will show what can be done. The patient, a young man of 20, the assistant foreman of a large machine shop, was seen in January, 1900. A year before that time he had passed through a severe attack of pleurisy, which evidently had completely compressed the right lung. In December of 1899, after having had fever and cough for several weeks, he began to expectorate blood, and in the space of three weeks had three severe hemorrhages, When first seen he was very anaemic, respiration 38, temperature 102.8°, there was cough with abundant muco-purulent expectoration, vomiting from the frequent paroxysms of coughs, some hoarseness; he had severe night-sweats, and occasional diarrhea. The family lived on the eastern slope of one of the hills surrounding this city.

The physical examination showed the right lung reduced to a small air-containing space at the apex, in which there was a cavity of considerable size; there was tubercular infiltration of the left apex as low as the upper border of the third rib. Tubercle bacilli in abundance in the sputum. There had been such a manifest and rapid decline that the patient readily accepted any suggestions along a new line. Accordingly, the windows of his living room were kept constantly open, day and night; during the day he was induced to sit out in the open lot surrounding the house, protected from the raw winter winds, when necessary, by a screen; he was to take food every three hours, the diet consisting mainly of raw eggs; concentrated soups, thickened with rice, barley or farina; fresh beef, lamb or poultry; and some stewed fruit. The night sweats were promptly controlled by a pill of agaricin, atropia sulphate and zinc oxide, and small doses of heroin sufficed to check the severe cough. Creosote, in capsule, was the only medicine given for any length of time, the dose was five drops. The boy entered heartily into all the details of the plan, and, except on rainy days, spent all the day out of doors. He soon noted a gain of weight and strength; the night sweats ceased; the cough grew less frequent and severe; the appetite improved; sleep was tranquil and undisturbed.

At the end of four weeks the evening rise of temperature scarcely exceeded one degree. The early improvement continued until he was able to get about freely without any shortnss of breath; and, having fitted up a small work shop at home, he turned his attention to making of models and original designs for machinery. Fifteen months after I first saw him an ischiorectal abscess developed, resulting in a small fistula. About the middle of the third year the cough increased, and the physical signs on the left side indicated an increasing infiltration. As the summer was very hot and oppressive, he was urged to try the mountain climate. He went to Colorado, where, at first, his trouble seemed to increase, so that he was bedfast for several weeks. He finally seemed to get another start, the more acute symptoms subsided, and when last heard from, a few months ago, was driving a wagon on one of the mountain roads. When it is remembered that he was practically dependent upon one lung, itself tubercular from the beginning, the fact that he is to-day alive and earning his own living can certainly be regarded as a triumph for the general measures employed in the treatment.

The residence treatment can not stop at the care of the patient. Without in any sense accepting the idea of the high contagiousness of pulmonary tuberculosis, when dealt with intelligently by the patient and the family, we must recognize the possibility of its transmission, when the simple rules of hygiene are neglected. The use of spit cups, the prompt disinfection of clothes, bedding or carpets accidentally soiled by expectoration, the maintenance of strict personal cleanliness, are matters of the greatest importance.

At a meeting of the Medical Officers of Health in England considerable stress was laid on the danger of sweeping and dusting the rooms occupied by phthisical patients. The brush and bucket should wholly replace the broom and duster; for the profession is firmly convinced of the infectiousness of dust to which the bacilli adhere; and with which, in some degree, they are mingled, even when expectoration is carefully watched; for the researches of Cornet have shown that the spray emitted in coughing, or in loud talking, contains the germs of the disease. The important feature brought out at this meeting was that children were apparently infected in the home alone. Children should, therefore, not under any circumstances be allowed to share the sleeping apartments with the tuberculous patient, who, where pacticable, should be the only occupant.

Throughout the entire management of the disease one precept should actuate both physician and patient—*nil desperandum.*

The residence treatment is not the treatment of tuberculosis under ideal conditions; but it is the literal fulfillment of the physician's obligation to assist the patient in doing the possible thing—the inspiring confidence on the basis of a justifiable hope for improvement and in carrying the patient, mentally and bodily, through the trying period of his affliction

until such time as he may again be able to shift for himself and cease to be a charge upon his friends or the community.

In connection with the foregoing article by Dr. Eichberg, the opinions of some other physicians on the same subject may be of interest:

Dr. William Osler, lately of Johns Hopkins University, now of Oxford, in an address delivered under the auspices of the Phipps Institute, of Philadelphia, recently, said: "Year by year I see only too many instances in which the mental attitude of the physician toward the disease clearly indicates that the idea of an efficient home treatment by fresh air has never been entertained. What I would like to plead for most earnestly is this home treatment of early cases by modern methods. I am not addressing myself now to city physicians. But I would appeal to the practitioners in the country and in the smaller towns and in the suburbs, where the conditions are so much more favorable. I have been much interested for several years past in a group of cases scattered all over the country, usually in the farmer or mechanic class, in which I have supervised with the physician a home treatment, often with striking success. * * * There have been disappointments; all cases are not suitable, all cases are not curable, and it is not easy to say which ones are likely to do well. The most favorable looking patient with a small patch in one apex may have a progressive disease and die in the best of surroundings, while a case with high fever, sweats and an extensive lesion may improve rapidly. * * * Let me mention in a few words the essentials in this home treatment of consumption in the small towns, country places and suburbs of our large cities. *First,* the confidence of the patient, since confidence breeds hope; *secondly,* a masterful management on the

part of the doctor; *thirdly,* persistence—*benefit is usually a matter of months, complete arrest a matter of years, absolute cure a matter of many years; fourthly,* sunshine by day, fresh air night and day; *fifthly,* rest while there is fever; *sixthly,* breadstuffs and milk, meat and eggs."

In an address under the same auspices, Dr. G. Sims Woodhead, of Cambridge, England, said: "Although I have faith in sending patients who can afford it to places where they can comfortably remain in the open air and where there is plenty of light, I think there is danger, and great danger, of overlooking the fact that the open-air treatment may be carried out at the patient's home, and that it is not so much a matter of getting a good climate as of getting pure, fresh air for the patient. There can be no doubt that sanatorium treatment has been successful, not because of special climatic conditions associated with each institution, but because, whatever the climate, the patient has been encouraged to live practically in the open; diet, exercise, and rest, of course, being carefully attended to. All acknowledge that sanatorium treatment is of inestimable value in tiding over the difficult and dangerous early period of the disease; but it will be still more valuable just in so far as it teaches the patient to carry out in his own home the principles and methods adopted in the sanatorium. It has always seemed to me that a patient will be much more likely to have faith in the efficacy of the methods used, if they are carried on in familiar surroundings and under conditions of climate, etc., to which he is usually exposed. If he is sent to a special climate, he is apt to think that the success of his treatment depends on something special in the climate; and whilst this is, of course, the case to some extent, in that in a bright, dry, bracing climate the open-air treatment is more agreeable and a cure effected more quickly perhaps, there is no fundamental difference between the two; the closer you can

bring your patient to his everyday life during treatment, the more likely he will be to carry out your instructions after discharge from the sanatorium. I may say that even at Cambridge, a place little above the sea-level, in the fen district, where fogs are frequent and sometimes very dense, great success has been attained in the open-air treatment of phthisical patients in the Addenbrookes Hospital."

EXERCISE FOR CONSUMPTIVES.

In Dr. Knopf's essay will be found described simple exercises which may be profitably employed to overcome a predisposition or tendency towards consumption. Undoubtedly any exercise which promotes the general health and thus increases the power of the body to resist the attacks of the bacillus is helpful as a preventive measure, but great harm may result from ill-advised exercise by one who has already become affected by the disease.

On this point Dr. Flick says: "It is very important to control the amount of energy used up by muscular action in the treatment of tuberculosis. Muscular action consumes energy and throws into the circulation products of combustion. When the organism is already on the verge of bankruptcy it is an easy matter to bankrupt it by an excessive amount of physical exercise. Persons who have fever or who are far advanced in the disease should not be allowed to take any exercise at all. As the fever disappears and as the patient gains in strength, exercise may be gradually taken up, but it must be so gradual that fatigue may always be guarded against. One severe fatigue may change a favorable case to an unfavorable one. It is safe to begin with a few minutes' mild exercise, such as walking twice a day, and gradually add from two to five minutes a day until the patient is able to walk several hours without fatigue. When fatigue is experienced by the amount of exercise permitted, the time should be cut down to a point at which fatigue does not ensue. With patients who have cavity formations and who have dilation of the right ventricle, exercise should be taken up with the most extreme

care. With some of these patients physical exercise can never again be taken up and they must be content with a life of inactivity. They have lost their reserve lung capacity and are unable, for this reason, to take exercise without putting a severe strain upon their organism, and especially upon the heart."

To the same effect is the following from Dr. Robert W. Craig, of Phoenix, Arizona: "Much has been said on the question of exercise for pulmonary invalids, and its value has been maintained by many good men, but I believe it has been the experience of most men who have seen large numbers of these cases that, as a general proposition, to take much exercise is the worst thing a patient can do, and almost every so-called cold and exacerbation of the tuberculosis is due to taking too much exercise.

"Almost every patient that comes to Arizona has been advised by his family physician to 'get out doors and rough it.' This he generally does soon after his arrival, and has to call in a physician to prescribe for his 'cold,' which is nothing more nor less than a result of his over-exertion. Any exercise or exertion which produces fatigue, anorexia (want of appetite), malaise (uneasiness), or causes an increase in the evening temperature, is a positive injury, and should be strictly prohibited.

"When the evening temperature reaches 99½° to 100°, short walks or drives may be allowed in the morning when the temperature is normal or below, but an evening temperature of 100½° or 101° is an absolute contraindication to exercise.

"Frequently patients will be met who have little or no temperature, but a marked degree of tachycardia (rapidity of heart action), which is an even greater contraindication to exercise than temperature."

THE CONSUMPTIVE'S DIET.

The proper diet for a consumptive patient is, of course, a matter to be determined by the attending physician, but the following opinions may be of some interest.

Dr. Lawrence F. Flick, director of the Phipps Institute, says: "Modern scientific treatment of tuberculosis means a carefully selected diet, life in the open air, regulation of exercise and such medication as will help injured organs to do their work in a physiological way. The diet must be one which will give the largest amount of nutrition with the smallest amount of labor on the part of the organs making the nutrition. Food, therefore, must be selected not only for its nutritive value, but for its nutritive value plus the ease with which it can be transformed into tissue. Of all foods, milk undoubtedly is the one which gives the best returns in nutrition for the smallest consumption of energy. Next to milk come eggs, after these, beef and mutton, and then leguminous vegetables. Meat contains a great deal of nutritive value, but its transformation into tissue uses up a great deal of energy, and for this reason it ought to be used only once a day. For the average tuberculous subject a good diet is one consisting of one meal of solid food a day, and three quarts of milk and six raw eggs a day. Fruit of all kinds may be allowed, and some of it should be used daily. Nuts which are easily digested, such as almonds, walnuts and pecans, may be used, and it is good practice to permit of their use at pleasure, as they require considerable mastication. No food should be permitted which is used for the mere purpose of tickling the appetite, *and,* above all things, pastry and dainties should be forbidden.

The milk and eggs may be distributed over the day at intervals of two hours, but no milk nor eggs should be taken within two or three hours of the full meal, before or after. The doctor should always definitely lay down the time at which food should be taken and the amount to be taken, and he should impress it upon the patient that the full quantity must be taken each time, whether there is a desire for it or not. When patients are assured that they can take this quantity of food, and that it is beneficial to them to take it, even when they are nauseated, they will take it as a matter of course, whereas otherwise, with preconceived notions about their inability to take it, they will decline it."

The value of fat foods, such as oils, fat meat, butter, etc., in producing immunity from tuberculosis is emphasized by Dr. A. N. Bell, of Brooklyn, N. Y., in his striking paper, "Stamina," read at the International Congress on Tuberculosis, at St. Louis, October 3, 1904, and published in the *Popular Science Monthly* for March, 1905. He brings out clearly the fact that health and proper nourishment afford immunity from tuberculosis, while feebleness invites it, and in support of his position as to the peculiar value of fat as an article of diet, he refers to the history of different races which have been healthy or tuberculous directly as their principal diet has been fat or not. It is well known that the North American Indians, who, before the cultivation of cereals was introduced by the white settlers, lived almost exclusively upon fat game, were remarkable for their strength and health, while now, since their game supply has been restricted and farinaceous food supplied instead, they have ceased to be a hardy race and tuberculosis is common among them. Similarly the New Zealanders have become tuberculous since they substituted the potato for fat meat as their staple food. Dr. Bell says:

"Relative exemption from tuberculosis, under all circumstances, is, according to my observation, due to the generous use and potentiality of fat food. My conclusion in this regard is fortified by many years' observation and study of the liability to consumption of people collectively, families and individuals, more or less proportional to their abstinence from fat foods. The most prominent example, of which I have never lost sight from youth up, is the negro race in America. I began my professional life among them when they were slaves and were always supplied with an abundance of 'hog and hominy,' not by any means restricted to these articles, but pork or bacon was a standing portion of at least one daily meal. Consumption among them was relatively rare. My observation in this respect was not singular, but accords with all other medical observers of the time of whom I have knowledge. Conversely, it seems hardly necessary to invite attention to the prevalence of consumption among the same people now, under their changed conditions with regard to diet. 'Hog' at least is notable by its absence from the daily fare of most of them, and no other fat meat has taken its place; and consumption among them is more than twice as great as it was formerly.

The same observation extends to smaller communities, families and individuals. Consumption is most prevalent among those who are stinted or who stint themselves of bacon and butter. I mention these as ideal and because they are among the most digestible of fat foods; other fat foods are commendable. Everybody has learned, when it is, unfortunately, in most cases, too late, that cod-liver oil is good for consumptives, but few seem to have learned that food of the same character as cod-liver oil, suitable for the table, is preventive of consumption.

In the whole course of my professional observation, now covering a period of more than sixty years, I have never known a family or individual that was brought up on a liberal supply of butter and bacon who became tuberculous; moreover, such food fortifies the system against other diseases as well as consumption; it establishes stamina."

In this connection attention is called to the remarks of Dr. Eichberg on the subject of diet in his article on "Residence Treatment in Unfavorable Climates."

THE MEDICINAL TREATMENT OF TUBERCULOSIS.

One of the first duties of a tuberculous patient is to seek competent medical advice. If this were always done, and if the physician consulted were always competent and honest, there would be no occasion for the layman to concern himself about the particular mode of treatment to be adopted for the cure of this disease. These conditions, however, are not always satisfied. We are largely a nation of self-doctors, and frequently undertake to treat ourselves when we ought to employ a physician. Moreover, the present method of combating tuberculosis is comparatively new, and many physicians have not kept up with the advance of medical science in this direction, and still employ old, useless and sometimes injurious methods of treatment; and, what is far worse, unscrupulous quacks abound, against whose advertised "sure cures for consumption" the public can not be too strongly warned. In view of these facts, it is important that the layman be informed, in a general way, as to the use of drugs and medicines in the treatment of this disease.

Medicines may be used with reference to tuberculosis for either of two distinct objects: First, for the purpose of curing some other disease or weakness in the body so as to enable it more successfully to resist the tubercle bacillus; and, secondly, as a specific cure for the disease itself.

The use of medicines for the purpose of building up the general health of the patient depends upon the principle that the body in good physical condition contains within itself the power to resist the attacks of the bacillus, which can find dangerous lodgment or make headway only in a body already en-

feebled from some other cause. It is practically impossible for a person in good physical health to contract tuberculosis, and even a person who has contracted the disease may overcome it, if he acts promptly, by improving his general health. The question as to what medical treatment, if any, shall be employed for the purpose of promoting the patient's general health, is, of course, a matter for the attending physician. It may be stated here, however, that the present tendency is towards a very limited use of drugs and medicines. Thus Dr. Lawrence F. Flick says:*

"Medication in the treatment of tuberculosis should always be a secondary matter, and should be resorted to only as a help to organs which are unable fully to perform their functions. In most cases stomachics and digestive ferments are indicated, because the stomach is not well able to do the amount of work thrown upon it unaided by artificial means. The bowels, which are apt to become clogged, need to be cleaned out frequently by some such purgative as epsom salts or castor oil. The heart needs to be closely watched, and when overacting, as indicated by an accentuated second sound, should be relieved by some such drug as nitroglycerin. Opiates and alcohol should never be used; neither should any drug which is depressing either upon the nervous system or upon the heart. The old-fashioned cough medicines should be absolutely eschewed. When the patient is suffering from a cold some benefit may be derived from the ammonia preparations, but even these should be used only temporarily. A safe rule is to use no drug unless there is a positive indication for it."

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*American Medicine, July 30, 1904.

Dr. A. Zederbaum, physician to the National Jewish Hospital for Consumptives at Denver, Colorado, writes as follows:*

"We in Colorado, who have to deal with armies of consumptives, are wasting but very little of our prescription blanks on any of the much advertised specifics that find more admirers elsewhere. Our patients, in the majority of cases, have had them galore before landing on our Rocky Mountain slopes, and seldom expect us to repeat the experiment. What they want of their medical adviser in Colorado is to instruct them how to make the best use of the climatic properties of our far-famed consumptive haven, to watch the effects of the climate on their health, and only to prescribe for those accessory ailments which usually accompany the tubercular condition. I should be sorry for the patient who got into the hands of a physician in Colorado that lays more stress on his favorite drug than of the climatic, hygienic and alimentary treatment of his consumptives."

In the same strain Dr. R. W. Craig, of Phoenix, Arizona, writes:†

"The very multiplicity of remedies is prima facie evidence that specific treatment of the disease is, to say the least, extremely unsatisfactory. It can at best be used as but an auxiliary to some more far reaching and fundamentally correct principle. As yet the results obtained from the use of serums have been practically nil.

"The value of tuberculin, even as a method of diagnosis, is questionable. Any drug that has a tendency to disturb the digestive apparatus is positively contraindicated, and I think

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*Colorado Medical Journal, March, 1904.

†New York Medical Journal and Philadelphia Medical Journal, December 3, 1904.

the personal observation of those men who come in contact with large numbers of tuberculous cases will bear me out in the statement that more damage has been done by the use of creosote, gniacol, ichthyol, etc., than can be counterbalanced by benefits derived."

With reference to the serum treatment, it may be said that serums injected hypodermically were for a time quite extensively used for the purpose of producing artificial immunity to tuberculosis. While good results have been secured by several specialists in selected cases, this method of treatment seems to have fallen into disfavor with the profession, and certainly no patient should consent to it unless he has the utmost confidence in the skill and integrity of his physician. The serum treatment is enormously expensive, and in the hands of most physicians is not unlikely to do more harm than good. So far as it is of value, even in the hands of a real specialist, it seems adapted to a limited class of patients only, and a physician who administers it indiscriminately to all of his tuberculous patients should be given a wide berth.

As to the use of medicine for the specific cure of tuberculosis there is only one thing to be said, but that can not be made too emphatic, and that is that *there is no known drug or medicine that will cure tuberculosis.* Ardently as a specific cure for this disease might be wished for, and eagerly as it has been sought, nothing of the kind has yet been found. Upon this point all reputable physicians are agreed. Nevertheless numerous unscrupulous quacks and charlatans continue to advertise "sure cures" for consumption, and in their audacity, by skilfully framed evasions, create the impression in their advertisements that their nostrums are endorsed by leading physicians. No respectable physician will prescribe or endorse any medicine whose ingredients are kept secret, as is

the case with these "cures," and no honest physician will endorse any "cure" for consumption when he knows that there is no such thing.

Some, perhaps most, of these advertisers claim that their remedies kill the germs in the system and thus eradicate the disease. Such a claim has been effectually disposed of by Dr. E. L. Trudeau, of Saranac Lake, N. Y., who established the first laboratory in America for the scientific study of tuberculosis, and who is probably the leading American investigator on the subject. He states that "A good deal of the work of the laboratory has been devoted to testing experimentally proposed specific methods of treatment and consumption cures, and the fallacy of all methods which aim at the destruction of the tubercle bacillus in the living tissues by germicidal agents was soon demonstrated."

Several years ago some of these advertisers by a misuse of the name of the Committee on the Prevention of Tuberculosis of the Charity Organization Society of the City of New York were creating an impression that their remedies had the endorsement of the committee, which thereupon issued the following warning:

"*Whereas,* It has come to the knowledge of the Committee on Tuberculosis of the Charity Organization Society that many so-called specific medicines and special methods of cure for tuberculosis have been and are being exploited, and

"*Whereas,* The advertisements of some of these cures have made such reference to the Tuberculosis Committee of the Charity Organization Society, or to some of its members, as to create the inference that this committee, or its members, recommend or advocate the use of many such so-called specifics or special methods of cure for pulmonary tuberculosis, or consumption, and

"*Whereas,* There is no specific medicine for this disease known, and the so-called cures and specific and special methods of treatment widely advertised in the daily papers are, in the opinion of the committee, without special value, and do not at all justify the extravagant claims made for them, and serve chiefly to enrich the promoters at the expense of the poor and frequently ignorant or credulous consumptives; therefore,

"*Resolved,* That a public announcement be made that it is the unanimous opinion of the members of this committee that there exists no specific medicine for the treatment of pulmonary tuberculosis, and that no cure can be expected from any kind of medicine or method except the regularly accepted treatment which relies mainly upon pure air and nourishing food."

This warning was published over the signatures of the entire committee, which comprises some of the foremost medical authorities in America, several of whom, namely, Dr. Knopf, Dr. Huddleston and Dr. Loomis, are contributors to the present work.

It is to be regretted that many of our best periodicals have admitted the advertisements of these so-called cures, and have thus lent their aid to those engaged in this nefarious business, but happily the better class of publications are now excluding such advertisements, and it is to be hoped that by such a course, together with the exposure of the whole "patent medicine" business now being made by several leading magazines, these heartless and unscrupulous quacks may be driven out of business.

THE PHYSICIAN'S PARAMOUNT DUTY TO THE PATIENT AND FAMILY IN PULMONARY TUBERCULOSIS.*

By CHASE P. AMBLER, M. D., Asheville, N. C.

As a profession we have for generations practiced medicine in so liberal a sense of the word that we have been far too quick to prescribe, and in the bustle and hurry of active practice have failed to grant to the patient the time that his case generally requires and should be accorded. We are to be censured for having taught the public to believe that each disease has its medicine or "Cure." Our preceptor believed in "placeboes" and prescribed such in numerous instances where no medicine was really indicated. This practice is in great part dying out, but as we have discarded this foolishness we have fallen into the greater error of depending upon drugs or so-called "specifics."

It is an unfortunate fact and disgrace to our profession, both city and country, that a large number of the consumptives living among us to-day have been "treated" for months, and in many instances for years, before the true nature of their malady was recognized; that symptoms, which should have been recognized and should have at once aroused suspicion of tuberculosis, have either been neglected or attributed to other causes. Thus, during the early stages of the disease,

*Read before the Anti-Tuberculosis League, Atlanta, April 18, 1905. Referred by motion to the press with request to reproduce same as a means of educating the public to the necessity of early diagnosis, and careful observation of directions given by physician.

by our own carelessness, have we, in thousands of cases, robbed the trusting patient of every chance for recovery, while we plied him with "tonics" and cough remedies.

Thanks to the medical requirements now enacted by all our states, this practice is not the result of ignorance on the part of our profession. It is, however, to our discredit that it can be traced too often to carelessness. We have not taken the time to thoroughly investigate; in malarious districts, slight chills and fever have been attributed to ague, while a blood examination would have shown this not to be the case; coughs have been bronchial and syrups prescribed; blood spitting has "come from the throat" because the examiner could not detect the presence of disease in the chest by placing his ear against the chest, fore and back, over several thicknesses of clothing. Temperature taken once a day for several days has been regarded as always normal, because it was so found at the time taken; loss of weight has been indication for tonics; suppressed menstruation has meant uterine trouble; a dry, hacking cough has meant laryngitis, and pains in the chest, intercostal neuralgia.

But rarely indeed do physicians point out to-day to the head of the family in which occurs a case of tuberculosis the necessity of examining each and every member of the family periodically for several years after the initial case has died or recovered. And yet, right here is where the most brilliant results are being accomplished by men who are careful and thoughtful.

It is not the purpose of this paper to censure the profession, but as this association is organized for the Prevention of Consumption, I wish to place myself upon record in your halls as advocating that the best means of "Preventing Consumption" is to discover the tuberculous disease in the patient before the stage of consumption has been reached.

Consumptives are persons dying with a tuberculous disease. Not one case in 500 fails to consult a physician on account of some symptom or other, long before the disease is far advanced. Tuberculosis *is not* the fatal disease that past generations have regarded it. It can be proven that a great number who develop the disease recover without discovering that they ever had it. Formerly it was rarely discovered before the patient was in a dying condition. Such cases promptly died and do to-day, with the result that the laity has grown, or been taught by us, to believe that the disease means death.

We are awakening in this country to the realization that this disease is the greatest destroyer among us to-day. One in every six or seven of our deaths is due either directly or indirectly to this disease. Of a given number of cases which have occurred in your practice individually, in how many instances did you discover the disease before the destruction of lung tissue had already occurred? Go further—in those cases not discovered early, was it not due to one of two facts, either the patient did not consult you until the disease was advanced, or, as you look back, was not your own carelessness and hurry the cause of the delayed diagnosis?

Our states may legislate; our national government may investigate; our philanthropists give their millions, and as physicians we may organize such societies as this, but in the end the only way it can at present be logically met is by the physician individually.

If we, as physicians, would recognize the disease earlier the battle would be over half won. It will continue to be thus; if we fail to do our duty in the future as our confreres have done in the past, the disease will go on unchecked.

Next to an early diagnosis the most important point for the physicians is the instruction of the patient. So long as the cowardly evasion of the truth to the patient be continued by

our profession, we must expect to see the disease become more wide-spread. The profession over the country is not as a rule telling the patient the truth. Those of us who reside at health resorts find that only men in our profession who are giving this disease careful and close consideration tell the patient the truth and instruct him regarding the disease, his danger to himself and to others, and point out the necessity for recovery. The rank and file of our profession, especially in the rural communities, apparently believe that the truth will damage the patient; and when they have carried him the whole length of drug and dope administration, have robbed him of every opportunity for recovery, by not instructing him and pointing out the path to recovery, they send him away from home in a dying condition, loaded with stinking and nauseating drugs and directions to eat and exercise, to keep away from resort doctors and report once a month to them by letter.

The truth told the patient, with explanations and proper instructions, does not harm him. In fact, in these two points lies the secret of successful treatment of this disease. Our first duty to the patient, from my point of view, is to tell him the truth, and then take the time to instruct him; to point out wherein he improves; to teach him wherever he is a source of danger to himself as well as others, and especially to show him this danger is as nothing, practically, if your directions be carefully followed and carried out. With the interest in this disease now developing we are going to the extreme; as we have groped in the dark and seen the multitudes die in the past, die, yes in many instances, because we considered the disease fatal, not realizing that the fault lie in ourselves in not discovering the true nature of the trouble earlier; die, yes, as we stand apart with the friends and look upon it as a part of the ways of God, our inaction, our do nothingness, our know

nothingness of those days was one extreme, and now we are educating the public to another.

Already the consumptive is an outcast, publicly to be shunned. The average consumptive *should* be kept from public places and gatherings, but now, when it becomes known that a person has tuberculosis, be it ever so slight, he is in many quarters looked upon as a leper, to be avoided as death itself. This is unjust to the patient, and is the result of telling only part of the truth by the physician and those who are waging the crusade against the disease.

The patient, his friends, his family and the public generally should know wherein he is in danger to himself and to others. The family should receive instructions from the physicians for their safety, and as long as the patient observes the rules laid down he should not be ostracised or made to feel that he has no place among men. The secret of prophylaxis and successful treatment lies in the instructions given by the physician, together with the hearty co-operation of the patient and family.

The success met with in institution treatment and the administration of so-called specifics (which require the constant attendance of the physician) is the result of the constant supervision, careful instructions and management of the patient, far more than any other means, or the specific applied. This being true in the institution, similar methods should be applied to our outside cases, to the fullest possible extent. The patient with a good heart, a good stomach, an early diagnosis made and sufficient means of support for several months without worry, violent or prolonged exertion, will permanently recover in 90 per cent. of the cases.

The day may come when we can as successfully vaccinate against tuberculosis as we do to-day against smallpox. Until

this day arrives prevention will mean prophylaxis. Prophylaxis will mean three things:

Earlier diagnosis,

Instruction of patient,

Instruction of family and friends.

This practically brings the whole matter home to the physician as it has been in the past: Will we go on as we have done in the past and depend upon our drugs to cure, while our uninformed and slowly rotting fellow creatures spread the seeds of this accursed disease in the home, on our streets, in our public places of meeting and worship; while we, as physicians, raise no protest when even our butchers and our bakers, while they themselves are suffering from the disease, are allowed to handle and sell to the public the foodstuffs of life?

Just now the proper fad is an out-door life; no one who understands the disease will oppose a life in the open air, but here, as elsewhere, the advice of the physician will be everything if success is to reward our effort. It will not do to tell your patient to go to Colorado, New Mexico or North Carolina and live out of doors. To live an intelligent out-door life and not run great risks of furthering the trouble rather than lessening it, is a question requiring the most careful consideration, preparation and intelligence.

Our average citizen has not this knowledge, and unless we go into detail and *explain, instruct, supervise, caution, encourage* and keep up the same everlasting vigilance, we will fail here, as we have so often failed in the past when using other means, and neglecting the one great question of all.

This convention will doubtless appoint a committee to draft resolutions embodying our idea as to the best means of preventing tuberculosis and consumption.

As a summary of my paper and in conclusion I wish to present to this body a few points, which, in my opinion, should be embodied in such resolutions, if adopted:

1st. Tuberculosis is not the fatal disease commonly believed.

2d. While communicable, it can practically be made innocuous by the proper course on the part of the patient.

3d. The chief cause of the large mortality is late diagnosis.

4th. Late diagnosis is caused by indifference of patient to early symptoms and carelessness on the part of the physician consulted.

5th. By thorough systematic instruction of the patient better results can be accomplished than by medication.

6th. Instruction of patient, family and friends, and close observance on their part of the rules laid down, will practically rob the disease of its method and means of extending.

On the subject of early diagnosis, Dr. Robert W. Craig, of Phoenix, Arizona, says:

"A successful treatment of pulmonary tuberculosis to-day depends above all upon an early diagnosis and the intelligent application of three vital principles, viz., open air day and night in a *suitable climate,* good food, and as nearly as possible absolute rest, physical and mental. With these conditions fulfilled most cases of tuberculosis should recover, or at least become so arrested as to be harmless.

"Delayed diagnosis so often means to the patient loss of all chance of restoration that I feel we can not be too careful in all suspicious cases. After gross pathological changes have taken place in the respiratory tract, and bacilli are present in the sputum, the diagnosis is easy, but there is no good reason

why pulmonary tuberculosis should not be diagnosticated in the prebacillary stage before even a cough has developed; that this diagnosis is being made much earlier than in past years is evidenced by the great increase in the number of incipient cases that are now sent to our health resorts and sanatoria. The malaise, loss of appetite, malnutrition, a continued afternoon acceleration of the heart's action, night-sweats, and evening temperature are as characteristic and classical of tuberculosis as in the presence of bacilli in the sputum.

"When such a case is recognized and put under the proper hygienic surroundings, in a climate admitting of an out-door existence, the patient should recover, but if the disease is not diagnosticated until a secondary infection has taken place, and he has rigors, high temperature, profuse expectoration, and the other symptoms so common to advanced cases, no change of climate, or change in his method of living, can do more than prolong life. I believe in an early diagnosis lies our only real hope in the successful treatment of this disease."

THE CAUSE AND PREVENTION OF CONSUMPTION.*

Circular Issued by the Illinois State Board of Health.

CONSUMPTION IS A WIDESPREAD AND DEADLY DISEASE. Consumption has been aptly termed the "Great White Plague." Of all diseases common to man it is the most widespread and the most deadly. As has been correctly stated, other diseases have caused more dismay, more panic and, occasionally, for short periods, even wider destruction, but consumption has been the most constant and the most pestilential of all; the worst scourge of mankind.

CONSUMPTION WAS THE CAUSE OF BETWEEN 7,000 AND 8,000 DEATHS IN ILLINOIS DURING THE PAST YEAR—nearly twice as many deaths as were caused by typhoid fever, diphtheria, scarlet fever, bronchitis (all forms), influenza, whooping cough and measles combined. The death rate from consumption was nearly six times greater than from any other dangerously communicable (contagious or infectious) disease.

CONSUMPTION KILLS MEN AND WOMEN IN THEIR PRIME. Its victims are mostly of the active working age. They die during the period of the greatest usefulness to the state.

In Illinois during the years 1902-3 the total deaths between the ages of twenty and thirty numbered 11,206, of which 3,958, or 35.32 per cent., were due to consumption. From thirty to forty years of age, the total deaths were 11,658, of which 3,026, or 25.95 per cent., were due to consumption. From forty to fifty years of age, the total deaths were 11,274, of which 1,969, or 17.47 per cent., were due to consumption. The total number of deaths during the two years between the ages of twenty and fifty, was 34,138. Of this number 8,953 died from consumption. The percentage of deaths due to consumption during this age period was 26.22, or over one in every four.

The death-rate from consumption in Illinois is not greater, however, than that in other states. Fully one-seventh of all mankind die of this disease. It is estimated that 1,000,000 lives are lost by this disease annually throughout Europe, and that 150,000 persons die each year in the United States of some form of consumption. Nat-

*This is undoubtedly one of the best circulars on consumption that has ever been published, and it is not surprising that the demand for copies, not only in Illinois, but also in almost every state in the Union, has been very great. The fifth edition (1905), with a few slight omissions, chiefly of matters of local interest, is here reprinted through the courtesy of Dr. James A. Egan, secretary of the Illinois State Board of Health.

urally consumption is more prevalent in certain climates and among certain races, but it spares no nation, no age, no occupation, no class of people.

CONSUMPTION IS A PREVENTABLE DISEASE AND IT IS A CURABLE DISEASE. Consumption can be prevented in Illinois; it "if the patient (consumptive) is treated from the beginning he will get well."
can be cured in Illinois, if taken in time, before much lung tissue has been destroyed. All authorities now subscribe to the views advanced by Hippocrates, the father of medicine, who lived 460-377 B. C., viz.,

CONSUMPTION IS A DISEASE WHICH IS CAUSED by the growth of certain germs (bacilli) in the tissues of the body. In the lungs the disease is known as pulmonary consumption. The germs causing the consumption in man and in cattle have been proven to be the same and the disease may be transmitted from one to the other, by means of the transmission of these germs.

There can be no consumption without the consumption germ.

Consumption is very rarely inherited, but children of consumptives often inherit weakened constitutions predisposing them to disease, which they easily acquire from others. Many cases of so-called "hereditary consumption" are due to the disease being transmitted from an afflicted member of the family to others, either directly or through the medium of dirt and dust in the infected rooms.

The means by which consumption may be transmitted are (a) through the air passages and into the lungs by dust infected from sputum of consumptives, (b) through drinking glasses, eating utensils and other articles placed to or in the mouth which have been handled or put in the mouth of others, (c) through the digestive tract from diseased meat or milk from tuberculous cows or from food infected by germ-bearing dust, (d) very rarely through the skin.

The consumptive in himself is almost harmless. He becomes harmful usually through bad habits which are due, as a rule, to ignorance. The consumptive who walks about or works in offices or shops will not transmit his disease to those with whom he comes in contact if he takes proper care of his saliva or sputum. Notwithstanding this well demonstrated fact many persons dread the presence of a consumptive and some employers will not even retain him in their service.

THE CHIEF MODE OF COMMUNICATION OF CONSUMPTION is from the dried sputum of consumptives. The germs of consumption, which are the cause of the disease, exist by the million in the sputum which may be hawked or coughed up and cast upon the sidewalk, the floors of public halls, workshops, and all public buildings, or upon the floors or carpets in dwellings; in fact, any place where the consumptive chooses to spit.

When the sputum becomes dried up, the germs which it contains in enormous numbers mingle with the air and dust of the building and may be breathed into the lungs and thus infect susceptible persons, one consumptive spreading the disease to many others. The danger is increased by the great vitality of the germs which exist for a long time after drying and mixing with the dust.

The minute drops of the sputum which consumptives expel when coughing also contain the germs of consumption.

It will thus be seen that the consumptive who is able to be about and goes from place to place and spits on the sidewalk, in the street cars or on the floors of public buildings, the workshop and the like, may be a far greater menace to the lives of others than the consumptive who is confined to his dwelling.

NO SPIT, NO CONSUMPTION.

The germs of consumption will often be found among dust and dirt in tenements and other dwellings where they may retain their vitality for months; also in cast off clothing. Dampness, darkness, dirt and dust all serve as a refuge for the germ of consumption.

THE SPUTUM SHOULD BE DESTROYED. The most certain method of preventing the infection of consumption is the destruction of the sputum of the consumptive. Not only the safety of the people but the safety of the patient himself requires that the sputum be destroyed before it can have an opportunity to become dried and mingle with the dust of dwellings, offices, factories and other places where human beings congregate.

How the Sputum May Be Destroyed.

THE CONSUMPTIVE SHOULD NOT SPIT ON THE SIDEWALK OR THE FLOOR of any building or street car or other public conveyance. If he fails to comply with this injunction he menaces the lives and health of others. He can, with comparative safety to the public, spit in gutters, especially those containing water.

NO SPIT, NO CONSUMPTION.

His room should be provided with vessels or spittoons in which there is constantly kept an abundance of disinfectant solution composed of carbolic acid and water. (Standard Disinfectant* No. 1.) This vessel, or spittoon, should be emptied in the water closet every day. Care should be used that sputum is cast into the solution in the spittoon and not on the edges, where it may dry and become an additional source of infection. If any of the sputum adheres to the side or edges of the vessel or spittoon, it should be washed off with the disinfectant solution.

When away from home, the consumptive should carry with him an abundant supply of small pieces of cotton or linen cloth or the like, which may be used instead of handkerchiefs, in which he can spit when a proper place is not available. These pieces should be burned, if practicable, before the sputum has an opportunity to dry. If this cannot be done, the cloths should be rolled and put securely in a paraffin paper envelop which should be burned at the first convenient opportunity. Each piece of cloth should be used but once. Pieces of cloth should be used instead of the paper napkins which are sometimes recommended. Paper napkins are fragile, easily torn or broken, are totally unfitted as receptacles for sputum, and a consumptive cannot properly wipe his mouth or hand with one.

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*See end of circular for list of Standard Disinfectants.

If the consumptive desires he can carry with him one of the several styles of pocket spit flasks found in the shops. These are of great service. They admit of easy cleaning and prevent any escape of the sputum in the pocket. These flasks are superior to the pieces of cloth above recommended, but in practice consumptives hesitate to use these, as they call attention to their disease, hence the Illinois State Board of Health also recommends other methods of disposing of the sputum.

THE ORDINARY SPITTOON with sloping sides, containing a quantity of disinfectant, is a practical receptacle for sputum. Unpleasant as the appearance of these spittoons in public places may be, were their use more general there would be less consumption. All consumptives will not use pieces of cloth or spit cups, but all consumptives will spit. Under proper regulations public spittoons could be emptied and cleaned regularly. Their universal use would contribute toward the saving of many lives.

Prevention—How to Avoid Consumption.

The important points in the prevention of consumption are: Pure air, sanitary surroundings, an abundance of light and fresh air and cleanliness in the dwelling, office and workshop, proper clothing, good food properly cooked, moderate rest and recreation, avoidance of all excesses; in other words, moderate living. The excessive use of alcoholic liquors lowers vitality, favors infection and hastens a fatal termination.

Every one should be prepared to battle with consumption. The disease spares no class of people. It spreads its terrors in the huts of the poor and the dwellings of the rich. Weakly persons, particularly those who have been exposed to the disease, or those descended from consumptive parents, should constantly be on their guard against this disease. These persons should seek out-door occupation.

DON'T SPIT ON THE SIDEWALK, on the floor of any building, street car or other public conveyance where the sputum will become dry and permit the spread of the germs which it may contain. When you must spit do so in a gutter, especially one containing water, in the opening of a sewer or into a spittoon. Set a good example for the consumptives, and thus contribute towards the saving of many lives, including perchance your own.

NO SPIT, NO CONSUMPTION.

If you are yourself afflicted with consumption (and you may be without knowing it) your spitting on the floors of your apartments may cause a further infection of your own lungs. Consumptives frequently recover from their disease without any treatment whatever when removed from the sources of infection.

Join in the anti-spit crusade. Favor the enactment and enforcement of laws prohibiting spitting on sidewalks, on floors, in street cars or other conveyances.

Do everything in your power to prevent those with whom you live or work or associate from spitting on carpets or floors of the house, the office or the workshop.

Use every endeavor to cause the consumptive with whom you live, work or associate to properly dispose of his sputum.

If you are a woman, do not wear skirts which sweep the sidewalk of the spit of the consumptives and other filth and thus carry disease into the house.

Don't put in your mouth money or articles which have been promiscuously handled by others.

Don't put your finger in your mouth or nostrils unless it is perfectly clean.

Don't neglect to wash your hands before you eat.

Keep the body clean. Bathe frequently.

Exercise daily in the open air in cold weather or in warm. Walking, rowing, swimming, cycling, golfing, horse-back riding or other exercises causing deep breathing are all of advantage if practiced in moderation. Walk erect. Breathe through your nostrils always.

Don't imagine that the strenuous exercises so much recommended now-a-days as a panacea for all ills will so strengthen your body as to prevent consumption. Many who have taken such exercises have died of consumption. Many more will succumb to this disease. Many more will die prematurely, as others have in the past, of diseases brought on by violent and unnatural exercises.* Many persons in the first stages of consumption, who were not aware of the presence of the disease, have hastened its progress by these exercises.

Don't sleep, if it can be avoided, in a room with a consumptive.

Don't kiss or unnecessarily shake hands with a consumptive.

Keep you premises clean. Have a thorough spring and fall house cleaning every year. See that this is more than "a lick and a promise."

Don't occupy premises formerly occupied by a consumptive, unless the premises have been thoroughly disinfected. Remember that the germ of consumption may retain its vitality for weeks or months in houses, especially when associated with dampness, darkness or dirt.

Overcrowding is one of the chief factors in infection.

The greatest danger of infection is in the house—the dwelling, the workshop, the office—where the sun and air play a far less active role than out doors. In dark places especially do we find greatest danger. Alleys, courts and rooms shut off from light are special breeding places of consumption.

But do not dread coming near a consumptive. Do not regard his disease as contagious like smallpox, diphtheria or scarlet fever. Much harm has been done through a totally unwarranted fear of the consumptive, which has caused him to be avoided as a leper. Consumptives are only a source of danger through discharges from diseased tissues—chiefly the sputum—and if these are destroyed contact with consumptive patients is free from danger.

It has been conclusively demonstrated that there is no infection in the breath of a consumptive.

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*"Do not become developed above normal. Athletes die quicker from consumption than their weaker brethren."—Dr. Norman Bridge of Los Angeles, before Chicago Medical Society, October 6, 1904.

Don't drink out of any glass, cup or vessel which has been used by another, unless it has been carefully washed. Let this apply to all drinking and eating utensils. Don't wear clothing which has been used by another unless properly disinfected. Avoid "rummage sales."

Don't work in a room where there is no fresh air. Don't sleep in a room where there is no fresh air. Have plenty of fresh air in your sleeping and living rooms in both summer and winter. Fresh air helps to kill the germ of consumption. Endeavor to breathe an abundance of fresh air day and night.

Avoid mouth breathing. Breathe through your nostrils. If unable to do this, consult a physician.

If your clothing or shoes become wet, make a change as soon as possible.

Don't neglect a cold or cough. Countless graves are filled with those who have done so. Colds reduce the vital forces of the body and make it easy for the germ of consumption to get a foothold in the lungs. The history of a large percentage of consumption cases is the history of neglected colds. Watch your general health. A prescription for your cough may save your life and the lives of others. Avoid patent medicines or "cure alls" fitted for each and every person.

Don't moisten your finger or thumb with your saliva when you turn the leaves of a book or handle money or papers.

Don't fail to consult a physician whenever you note the appearance of any of the symptoms mentioned on the next page.

Consumption and Schools.

The confinement of large numbers of children in schools unquestionably makes a school room a source of danger from contagious or infectious diseases. A susceptible child exposed to consumption is exceedingly liable to contract the disease.

No teacher known to be afflicted with consumption should teach in a school.

No pupil known to be afflicted with consumption should attend a school.

No employe known to be afflicted with consumption should be allowed to work in the school.

The school room should be well ventilated. The best uses should be made of the poorest facilities of ventilation.

The school room should be flushed with fresh air during intermissions by opening windows and doors.

Children should not be permitted to use any pencil or other article belonging to another, which is liable to be put in the mouth.

Children should not be permitted to use slates.

Children should not be permitted to spit on the floor.

NO SPIT, NO CONSUMPTION.

Children should be instructed to rinse the school drinking cup before using. In cities having running water supplies the use of any drinking cup, except that belonging to the individual child, should not be permitted. School authorities should install drinking faucets with a constant upward flow from which the children can drink directly. These prevent contagion.

The use of the individual drinking cup is recommended where the upward flow faucet is not available.

Children should be instructed to carefully wash before using all whistles or other instruments or toys purchased in shops or of hawkers on the streets, which may have been put in the mouths of would-be purchasers or of venders displaying their wares.

Unclean, dusty floors harbor disease germs and are very common carriers for contagion.

The floors of school rooms should be scrubbed frequently.

The floors of school rooms should be wet before sweeping, with sawdust saturated with Standard Disinfectant No. 3, which is inexpensive.

The desks and seats and window ledges should be washed frequently with the same disinfectant.

The entire school room should be disinfected at least once every three months.

Children should breathe through their nostrils. If a child is a "mouth breather" the teacher should call the attention of the parents to the fact that the condition predisposes to nasal or bronchial catarrh and possibly pulmonary complications.

Stooped and cramped posture of the child compresses the chest and prevents natural deep breathing, predisposing to weak and diseased lungs. This may be largely overcome by properly constructed seats and desks suited to the size of the child.

Not only the children but the teachers also should go out doors during recess unless the weather be stormy. This "out dooring" is necessary for the child; it is always desirable for the teacher, and in many cass absolutely necessary.

Symptoms of Consumption.

The onsets of all cases of consumption are by no means the same. In fact, many people have consumption and the disease is arrested in the very early stages before there have been any symptoms which would lead to a suspicion that the disease existed.

The first symptoms of the disease may be loss of appetite and loss of weight, fatigue on slight exertion, general feeling of languor, lack of energy and ambition, rapid pulse, fever in the afternoon and evening and a cough which is most noticeable in the morning. Chills often occur during the early stage of consumption. The cough may have existed for months, with practically no impairment of the general health, or the slight, hacking cough, usually worse in the morning, may have been so insignificant or may have occasioned so little annoyance, that the patient will deny having a cough at all or will remember it only after careful questioning. Consumption often follows pnuemonia, measles, and whooping cough.

There are other individuals who are subject to "colds," these colds occurring with increasing frequency and each one resisting treatment more stubbornly than the one which preceded it, these attacks leading up to the one which remains. Such an onset of consumption is so insidious that the disease is often firmly established before the patient's suspicion as to the nature of his ailment is at all aroused.

Many cases of consumption progress to a serious stage, supposed to be "chronic grippe," "chronic malaria" or "dyspepsia."

Gradual loss of weight should make a person suspicious and should cause him to seek the best medical aid for careful physical examination and examination of the sputum for evidence of consumption. This is especially the case if, in addition to the loss of weight, there is a loss of appetite, with increased frequency of the heart beat, afternoon fever and morning cough.

In a consumptive the temperature often falls below normal (98.6) in the morning and frequently rises to 100 in the evening. It would be well, therefore, for a person who suspects he has consumption to take his temperature morning, noon and evening for several days and make a record of it, which will be of value to the physicians whom he consults.

As the disease progresses the symptoms become more distinctive. The evident wasting, the daily fever and unnatural brightness of the eyes, the flushed cheeks, the night-sweats and the continued cough and expectoration indicate more definitely the invasion of the disease.

Hemorrhage from the lungs, following or associated with any of these more or less characteristic symptoms, will point with reasonable certainty to the existence of consumption.

Any or all of these symptoms should cause the patient to seek at once the most competent medical advice.

Unfortunately, many consumptives fail to heed the advice given them. This is especially true in the earlier stages of the disease, when the patient, instead of availing himslf of a method of cure, spends a goodly portion of his time in trying to persuade himself, his friends and even his physician, that an error has been made in his case. To such patients the evidence brought out by the symptoms presented, by a physical examination of the lungs and a bacteriological examination of the sputum, counts but little. This is unfortunate, not only for the consumptive, but for the people at large.

If You Have Consumption

FOLLOW THE GOLDEN RULE: "Do unto others as you would that they should do unto you."

IT IS NOT NECESSARY THAT YOU GIVE THE DISEASE TO OTHERS. This circular has taught you to a great extent how to avoid doing so.

DON'T EVER SPIT ON ANY FLOOR. DON'T EVER SPIT ON ANY WALK. NO SPIT, NO CONSUMPTION.

Read the instructions of this circular under "How the Sputum May Be Destroyed," and under "Prevention." There you will learn where and how you can safely spit whenever necessary.

DON'T SWALLOW THE SPUTUM YOU HAWK OR COUGH UP. It is often the cause of re-infection. Many patients who would recover from the original infection, cause incurable disease by swallowing the germ-ladened sputum.

BE HOPEFUL AND CHEERFUL. Remember that consumption is often a curable disease and that consumption can often be cured

in Illinois. It is not difficult to cure consumption in its early stages, and it is remarkable how life can be prolonged in patients who are quite far advanced in the disease, but who keep up a continuous fight by living in the open air, and following medical advice as to exercise, diet and mode of living.

There is no other disease in which so much depends upon the individual efforts of the patient. It is not so much a matter of medicines as correct living, proper food, proper exercise and out-of-door life.

Live OUT-OF-DOORS AS MUCH AS POSSIBLE. Keep at least one window open in your bedroom **day and night, winter and summer.** Don't be afraid of night air. Night air is the only air that you should breathe between 5 to 8 p. m., and 5 to 7 a. m. The air of a closed room should never be breathed. Select a room which has an abundance of sunlight. The largest, sunniest and best ventilated room that you can get. If possible select a dry climate with, at least, a moderate elevation, preferably hilly. At any rate, do not live in a house situated on low, wet ground, or too much shaded by trees. Sunlight is the greatest enemy of the germ of consumption. The direct rays of the sun, however, are very exhausting to a consumptive, who should at least keep his head and shoulders well protected when out-of-doors.

Too much stress cannot be laid on the disadvantages to the consumptive of a residence on damp soil. Dampness is one of the factors predisposing the patient to consumption and it is also a factor in hastening the progress of the disease. It has been noted that consumption occurs far more frequently on low, damp soils than upon those which are dry, and it is also amply proven that the progress of the disease once acquired may often be checked by removal to a soil which is porous, elevated and dry. The benefits to be gained by the consumptive from a residence on a suitable soil can hardly be overestimated. A gravelly soil of good depth, situated on a slope, makes an ideal site for a consumptive's home.

If you must work, select some out-door occupation requiring but little manual labor. A change from city life with work in-doors to open-air life in the country will often accomplish excellent results.

But you must not exercise too much. Consumptives frequently exercise themselves into the grave. Persons who have fever, a rapid pulse, are below weight, or are far advanced in the disease, **should not take any exercise at all.** There are times when the **lungs must have almost absolute rest.** As the fever disappears and as the patient gains in strength, exercise may be gradually taken, but fatigue must be guarded against. Unnatural exercises have killed many consumptives who might otherwise have recovered. **Beware of the man who tells you to walk several miles daily and expand your lungs. He is dangerous.**

Breathe through your nostrils, not your mouth. Keep your body clean.

Keep out of crowds and away from dust, smoke and dampness if possible.

Smoking is not good for you, but if you must smoke, do so only in the open air. Smoke a pipe or cigar; **no cigarettes.**

Eat an abundance of properly cooked, wholesome and easily digested food. Plenty of **meat, and bacon, eggs and butter.** A quart of **milk** or more should be drank daily if possible. Avoid sweets and indigestible things. If you change climate be moderate in your diet during the first few days.

Avoid patent medicines and "cure-alls." There is no medicine known which will cure consumption. In the treatment of this disease drugs are often of value in regulating the functions of the body, but they must be prescribed intelligently. Get the best medical advice and follow it.

Avoid the use of alcoholic drinks unless prescribed by a physician. They may reduce the vitality and, used in excess, will make the patient careless in the protection of others from infection. Drink plenty of good water.

Dispose of your sputum in the manner indicated herein. Don't infect others and don't re-infect yourself. If the sputum you expel is kept moist it will be rendered almost harmless. Be sure that the sputum is properly disinfected before it becomes dust.

When you cough severely hold your handkerchief or a piece of cloth before your mouth. Don't kiss other persons on the mouth.

Don't shake hands with people unnecessarily. Keep your hands clean.

Don't work about cattle, or in dairies, or sell or prepare or handle any foods to be used by others.

Don't moisten your finger or thumb with your saliva when you turn the leaves of books or count or handle money or papers.

THE IMPORTANT ESSENTIALS IN THE TREATMENT OF YOUR DISEASE: Live "out-of-doors" day and night, winter and summer. Wear PROPER CLOTHING. Have no fear of night air and none of draughts. Court the sunshine. Avoid damp houses or rooms. Avoid crowds, smoke and dust. Avoid all excesses. Be careful that you do not exercise when you should rest. Eat plenty of good, nourishing food. Drink plenty of good water. Keep your body clean. Take no drugs except on the advice of a physician. Never swallow the sputum which you hawk or cough up. Be hopeful and cheerful.

Mothers suffering from consumption, either in early or advanced stages, should never nurse their infants. It drains the strength of the mother, hastens fatal termination and subjects the child to danger of infection.

The Hygiene of the Sick-Room.

God gives man an abundance of fresh air and sunlight for his daily use. Man, with the perversity which characterizes the human race, immures himself behind wooden or stone walls, and excludes or grudgingly admits even that air and light which is necessary for his well-being. The sickness or death resulting from this violation of the laws of nature is invariably attributed to "the will of God."

CONSUMPTION IS A HOUSE DISEASE. It is a disease which is produced by residence in houses. The germs which cause it thrive in the living quarters of man, where sunlight and fresh air are often excluded. It is in the house that consumption is contracted and

in the house that the disease develops. It is in the house that the disease remains, to attack new inmates, weeks or months after the death or departure of the patient by whom the germs were implanted.

In the consideration of the hygiene of the sick-room attention must be devoted to the health and welfare of the members of the family not afflicted with the disease, as well as that of the patient. There must be no spread of the contagion. This can be prevented if the instructions below be complied with.

Fresh air and lots of it, sunshine and absolute cleanliness are requisites in every household.

The dwelling must not be located on damp ground. It must be freely accessible to the rays of the sun.

THE SICK-ROOM must have an abundance of fresh air, day and night, winter and summer. If this is not the case, the patient will die and it will be impossible to avoid infecting those who are in attendance upon him. The room occupied by the consumptive should face the south, if possible, or better, have windows both south and east or west. The sun must enter the sick-room.

The sick-room should be large, easily ventilated and as far from the living and sleeping rooms of other members of the family as it is practicable to have it. All ornaments, carpets, drapery and other articles not absolutely needed in the room should be removed. A free circulation of air from without should be admitted both day and night, and there should be as much sunlight as can be secured. Place the bed as nearly as possible in the middle of the room. The consumptive should sleep in a room by himself.

Scrupulous cleanliness in every portion of the premises should be enforced. All decaying animal and vegetable matter and every kind and source of filth in and about the house should be removed, and disinfectants should be freely used. Surface drains and gutters, areas, out-houses, privies, shelters for domestic animals, fowls, etc., should receive close and constant attention and Standard Disinfectant No. 1 or 4 should be used freely and regularly in every such place.

Basements and cellars must be kept dry and freely aired. Unslacked lime should be used liberally in the basements.

The patient should really live out-of-doors day and night. Fresh air and plenty of it is one of the best cures for consumption. There is no danger from draughts if the patient is kept well covered.

Where a proper room is not available in the house, the invalid can make use of an ordinary wall-tent and fly in the yard. The tent should have a good board floor, well raised from the ground. Or a wide porch on the house, with an eastern or southern exposure, can be utilized as a sleeping and living room during nights or unpleasant weather. In the day time the patient should remain out-doors continually if possible. The porch can be boarded in at the bottom and fitted with window glass, which should be so arranged as to permit free entrance of air. In the summer time the porch can be enclosed with wire screen, painted white, which permits the free entrance of air and excludes flies, mosquitoes and the vision of the curious.

As already stated, the consumptive in himself is almost harmless. He becomes harmful usually through bad habits, such as spitting.

He becomes harmful also through coughing, a symptom of the disease which the consumptive cannot control. Fine particles of saliva

are often expelled in coughing and these, being thrown some distance from the patient, become a very potent means of infection unless extraordinary precautions are taken.

Frequently, when the patient is bed-ridden, and especially during the last few weeks of life, he is totally unable to prevent the spread of infection and it is often impossible for the attendant to do so. It is necessary, therefore, to constantly clean everything which may become soiled: the bed clothes, clothing of the patient, the floor, the furniture and the walls. A pail or tub of Standard Disinfectant No. 3 should be kept in the sick-room and in this all clothing, blankets, sheets, towels, etc., used about the patient or in the room, should be dropped immediately after being used and before being removed from the room. They should be well boiled as soon as it is practicable. Rags, toilet paper or other material used about the person of the patient should be immediately burned. Standard Disinfectant No. 3 may be also used to clean the woodwork, floors, walls, etc.

In the room the sputum should be received in a spit cup or spittoon containing a disinfectant fluid. For patients not able to sit up, a small spit cup with a handle should be used. The spittoon or spit cup should be emptied daily into the water closet, not in the yard. If the cloths or handkerchiefs are used, they should be immediately burned Boxes filled with sand or sawdust should not be used.

NO SPIT, NO CONSUMPTION.

The floor, woodwork and furniture of the room should be wiped with a damp cloth and not dusted. A feather duster should never be used. When necessary to sweep, use a broom dampened with a disinfectant solution.

Do not attempt to disinfect a room when occupied by a patient, by the use of volatile chemical agents, as chlorine, sulphur or formaldehyde. It cannot be done, and you simply waste your time and annoy the patient.

IF DEATH SHOULD OCCUR the body must be wrapped in a sheet thoroughly soaked with Standard Disinfectant No. 3, and placed in an air-tight coffin, which must remain in the sick-room until removed for burial. Public funerals and wakes over such bodies in the infected house should not be held.

DISINFECTION. After recovery or death, all articles worn by, or that have come in contact with, the patient, together with the room and all its contents, should be thoroughly disinfected by burning sulphur in the following manner:

(a) Paste strips or sheets of paper over the keyholes, window cracks, door cracks, fire-places, stove holes and other openings except the door of egress. Have all windows and doors shut. See that all chimney flues and fire-places are tightly closed.

(b) All articles in the room that cannot be washed must be spread out on chairs or racks. Clothing, bed covers, etc., should be hung on lines stretched across the room. Mattresses should be opened and set on edge. Window shades and curtains should be spread out full length. If there is a trunk or chest in the room, open it, but let nothing stay in it. Open the pillows, so that the sulphur fumes can reach the feathers. Do not pile articles together.

(c) Use three pounds of powdered or crushed sulphur for every 1,000 cubic feet in the room. A room 10 feet long, 10 feet wide and 10 feet high has 1,000 cubic feet. For a closet half as large, use two pounds of sulphur.

(d) Burn the sulphur in an iron vessel. Take a tub partly filled with hot water, stand some bricks in it; put the sulphur in the vessel, then place the vessel on the bricks, moisten the sulphur with alcohol and ignite it, taking care not to inhale the fumes. When the sulphur begins to burn, close the room tightly by sealing the doors of egress and keep it closed for ten hours or longer.

Sulphur candles can be used instead of crude sulphur, but care must be taken to use sufficient candles. The average candle on the market contains one pound of sulphur. Three of these will be required in the disinfection of a small room, 10x10x10. Do not use a less number, no matter what directions may accompany the candle. The water jacketed candle is preferable. Fill the tin around the candle with water and place candles in a pan on the table, not on the floor. Let at least one-half pint of water be vaporized with each candle. If practicable vaporize more water. In the absence of moisture, the fumes of sulphur have no disinfecting power.

(e) After the apartments are opened, take out all articles and place them in the sunshine. Carpets should be well beaten and exposed to the sun.

(f) All surfaces in the room should then be thoroughly washed with Standard Disinfectant No. 3. Wash well all out-of-the-way places, window ledges, mouldings, etc. Floors, particularly, should receive careful treatment, and the solution should wet the dust and dirt in the cracks.

(g) Mattresses and pillows soiled by discharges should be burned. It is better to burn all toys and articles of small value which have been handled by the patient. Books which have been handled by the patient can be saved. Lay them on edge on a table with leaves open, in a room during disinfection.

There is one serious objection to the use of sulphur and this should be fully understood. The fumes of sulphur have a destructive action on fabrics of wool, silk, cotton and linen, on tapestries and draperies, and exercise an injurious influence on brass, copper, steel and gilt work. Colored fabrics are frequently changed in appearance and the strength impaired. Fabrics, however, can be effectually disinfected by hanging them on a line exposed to the sun and wind for several days. Curtains and all articles of cotton or linen by boiling and soaking them in Standard Disinfectant No. 3 for several hours, and portable articles of brass, copper, steel and gilt work, by washing with a strong solution of carbolic acid (Standard Disinfectant No. 1). Colored fabrics which have been in a room during disinfection should be immediately exposed to the sun and wind. Uncolored fabrics which will not be injured by moisture should be at once soaked in water. This action will prevent further injurious action of the sulphuric acid.

In the disinfection of stores, halls, school houses and apartments or dwellings in which there are no articles to be injuriously affected by the gas, sulphur is an ideal disinfectant. Its mode of application is simple (the simpler the method in disinfection the better), it is cheap, the material is accessible everywhere, and finally, the most im-

portant of all, the action will be invariably found when the sulphur is properly used.

Formaldehyde (formalin), which, when properly generated, possesses all the advantages of sulphur, may be used instead of the latter. A simple and yet generally effective method of disinfection with formaldehyde consists in the evaporation of a quantity of a solution of this agent, by means of heat, in a kettle or pot. The following is the method to pursue. Select a pot holding about five gallons. Fill it half full of water. Bring the water to a boiling point. Then add 40 ounces of formaldehyde, and leave sufficient flame under the pot so that all the contents will slowly boil away. This quantity of formaldehyde is sufficient for the disinfection of a room of ordinary size. Do not put more than 40 ounces of formaldehyde in one pot. To obtain proper results it is absolutely necessary that the best quality of formaldehyde or formalin be used. Much of the formaldehyde sold in the United States cannot be relied upon. In this method of disinfection the room must be tightly sealed, as in disinfection with sulphur. Keep the room closed for at least ten hours after disinfection begins. The best results will be attained if an apparatus especially devised for this method of disinfection is secured. Such an apparatus is manufactured by Truax, Green & Company, of Chicago. This is recommended to health officers and physicians.

None of the so-called formaldehyde candles found on the market should be used.

As to Change of Climate.

"Climate in consumption is a will-o'-the-wisp. It is the end of the rainbow with its pot of gold. It is ever just a little beyond. It rests in Colorado, New Mexico, Arizona, California. Like children in their simple faith chasing the rainbow's vanishing end and delving for treasures where once it stood, our patient pursues his phantom till worn and wasted, weary, but hopeful still, he falls asleep and wakes to learn that the magic end of the bow of promise rests upon the mystic shores of the spirit land."

While certain climates may be preferred for certain consumptives, it is nevertheless the consensus of opinion of the leading authorities of the day that there is no climate which has a specific curative power over consumption. Many, including Dr. S. A. Knopf, of New York, an acknowledged expert on the treatment of consumption, holds that cures effected in the home climate, in which the patients will have to live and work after their restoration to health, are more lasting and assured than cures obtained in more genial climes. While it is known that patients cured in the salubrious regions of the West have been able to return and live in Illinois and eastern states from whence they came, it is also known that others can never leave the climates in which they recovered, for on their return to their own state their disease recurs.

There are many reasons why an attempt should be made to cure a consumptive patient at or near his own home if it be in a climate not unsuitable for the cure of consumption; many reasons why he should not be sent a long distance from home.

Separation from friends depresses the patient. "Homesickness" is a malady which often baffles the physician.

The expense of the journey is a serious drain on his resources and is often incurred unnecessarily. As has been aptly stated by the State Board of Health of Maine, "many patients could be well put on the road to recovery in their own state at a cost which would barely defray their expenses to and from Colorado and Arizona."

The fatigue of a long journey is bad for a consumptive.

The lack of home comforts in a distant state and the inability often to obtain proper accommodations unless at a prohibitive price, naturally handicap the best efforts made to cure the patient.

The expense of living in the states having "specific" climates is great. Even if his disease be cured the patient may not be able to return to live in his home state.

If the patient must work he can find no occupation. Too many have preceded him.

It is known that in certain western states doors are closed to the consumptive and legislation against him is contemplated.

For the wealthy patient, who can be surrounded by his relatives and friends wherever he goes, a change of climate may be desirable; for the poor patient—and consumption is often a disease of the poor—a change of climate frequently quickens an unfavorable termination of his disease.

The consumptives of Illinois should not forget that their disease can, as a rule, be cured in Illinois, if it can be cured anywhere.

Consumption has been cured in the past and is still being cured in Massachusetts, Rhode Island, New York, Pennyslvania and other eastern and central states. Not one of these states offers special advantages in altitude, temperature, sunshine, air or soil, or other elements necessary to the successful treatment of consumption which cannot be enjoyed in Illinois.

It is often not so much the best climate for the disease as the best place for the consumptive.

Before changing climate, the consumptive should obtain competent medical assurance that the change will be beneficial. A climate or altitude which is suitable for one consumptive may cause the speedy death of another. An extremely hot climate is often not only more exhausting but more dangerous to the consumptive than an extremely cold climate.

The consumptive should not go to any state without first informing himself as to the exact locality he is to visit and the certainty of securing suitable accommodations in hospital, hotel or boarding house. A neglect to do this has caused untold trouble and misery to consumptives and has resulted in the death of many unfortunates. The State Board of Health will gladly furnish any consumptive in Illinois with a list of the sanatoria and hospitals for consumptives in any of the eastern, southern or western states, with such information regarding the climate and altitude as may be desired.

Consumption can be cured in almost any climate. It is pure air and sunshine and not a particular climate which is the essential factor in the treatment of consumption, and as has been noted, the cures of consumption accomplished in the home climate in which the

patients remain are often more lasting and more assured than when cures have been attained by temporary residence elsewhere.

No special climatic advantages are claimed for the many hospitals for consumptives in New York, Massachusetts and Pennsylvania and other states in which consumption is being treated so successfully.

On the subject of climate, Dr. Lawrence W. Flick, of Philadelphia, director of the Henry Phipps Institute, a recognized authority on the treatment of consumption, says: "Tuberculosis can be cured in any climate. All that is necessary is life in the open air, proper food, well regulated and carefully disciplined conduct, and, in more advanced cases, properly directed rest and exercise. People who can command these things at home can be cured in their homes. People who cannot command them should be treated in sanatoria. Most people can be treated better in sanatoria than in their homes."

On the same subject Prof. Dr. G. Cornet, of Berlin, a writer of international reputation, speaks as follows, in 1904: "To-day we rightly regard no one climate as specific. Tuberculosis occurs in the warmth of the South, as well as in the colder North, and upon lofty plateaux. Recoveries, too, are seen in every clime."

In an article recently published, Dr. Flick speaks even more emphatically on the treatment of consumption in ordinary climates. He says: "Tuberculosis can be successfully treated anywhere. Climate has practically nothing to do with the matter. Formerly climate was looked upon as the most important factor in the production of tuberculosis, consequently it was also looked upon as the most important factor in the treatment. For many men it is difficult, even at the present time, to give up these ideas. It has been demonstrated, however, by practical tests, that the disease can be successfully treated anywhere."

Certain general features of climate are unquestionably to be desired. Sufficient elevation and a soil porous enough to preclude excessive moisture, freedom from high winds, especially in dusty localities, and, above all, conditions which permit the greatest amount of time in the open air and sunshine, are essential to the most successful results. Aside from these factors, there are others of less importance which may prove of great advantage to the individual patient, but which cannot be regarded as essential to recovery.

That many of those conditions once regarded necessary can no longer be held so, is shown by a comparison of the results obtained in the treatment of consumption in the so-called "ideal climates" with the results obtained in the consumptive hospitals in other localities. More recoveries have been shown to have taken place in the Massachusetts State Hospital for Consumptives at Rutland,* with its rigorous winters, its moderate elevation (1,050 feet), its great rain-fall and prevalence of cloudy days, than at the United States Army Sanatorium at Fort Bayard, New Mexico, where all of the conditions of elevation (6,000 feet), mild climate, dry atmosphere, moderate rain-

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*484 patients were treated in the Massachusetts Sanatorium in 1903. 223 had advanced phthisis. Of these 223 patients 21½% were cured; 64% much improved, and 13% unimproved. One patient died. 261 patients had an incipient form of the disease. Of these 89% were cured and 11% improved.—Colorado Medical Journal, March, 1904.

fall and almost constant sunshine are found, serving to indicate that some moisture in the air is perhaps not so injurious as was formerly supposed. It has been further shown that some patients improved at Rutland after failing to do so under the best of care and during a lengthy trial in the arid regions of the West.

Many institutions in the East which are so successful in the treatment of this disease are not situated at high altitudes, nor has practical experience borne out the claim that high altitudes are necessary; in fact, some of these consumptive hospitals in which most gratifying results have been attained, have elevations of less than 500 feet. "The sending of consumptive patients indiscriminately to great altitudes," said Dr. Paul H. Carrington, on October 14, 1904, before the International Congress of Military Surgeons at St. Louis, "has caused the death of hundreds who, under judicious treatment, would have recovered." Surgeon Carrington is in charge of the government sanatorium at Fort Stanton, N. M., and has made a careful study of consumptive cases. This remark shows the great change in expert opinion in the last few years.

It has already been demonstrated that, with out-of-door life and proper methods of life, recoveries from consumption have taken place as frequently at Rutland as in institutions where the ideal climatic conditions are said to exist, and the fact that in Illinois there may be found all of the climatic conditions, sunshine, freedom from excessive rain or high winds, temperature and satisfactory soil, possessed by Rutland or other eastern hospital sites, and a sufficient elevation above the sea level, indicates plainly what Illinois can accomplish in the treatment of her unfortunates at home.

It is useless, however, to attempt to cure consumption in Illinois or elsewhere, in houses from which sunshine and fresh air are excluded, or in those which are kept in an unsanitary condition.

Standard Disinfectants.

The following are simple, cheap and most reliable disinfectants:

STANDARD DISINFECTANT NO. 1.

Four Per Cent. Solution of Chloride of Lime.

Dissolve chloride of lime of the best quality in water, in proportions of six ounces of lime to one gallon of water.

This is one of the strongest disinfectants known. Discharges from the bowels of a patient suffering from a contagious or infectious disease should be received in a vessel containing this solution, and allowed to stand for an hour or more before being thrown into the vault or water closet. Discharges from the throat or lungs should be received in a vessel containing this solution.

Chloride of lime in powder may be used freely in privy vaults, cesspools, drains, sinks, etc.

Instead of the solution of chloride of lime, carbolic acid may be used for the same purposes, in a strength of 6½ ounces to the gallon of water. This makes a 5 per cent solution of carbolic acid.

STANDARD DISINFECTANT NO. 2.

Bichloride of Mercury, 1-500.

Dissolve corrosive sublimate and muriate of ammonia in water, in the proportion of two drachms (120 grains—¼ ounce) of each to the gallon of water. Dissolve in a wooden tub, barrel or pail or an earthen crock.

Use for the same purpose and in the same way as No. 1. Equally effective but slower in action, so that it is is necessary to let the mixture (disinfectant and infected material) stand for about four hours before disposing of it. This solution is odorless, while chloride of lime solution is often objectionable in the sick-room on account of its smell.

STANDARD DISINFECTANT NO. 3.

Bichloride of Mercury, 1-1000.

Dissolve one drachm (60 grains—⅛ ounce) each of corrosive sublimate and muriate of ammonia in one gallon of water. Dissolve in a wooden tub, barrel or pail or earthen crock.

Use for the disinfection of soiled underclothing, bed linen, etc. Immerse the articles for four hours, then wring them out and boil them. This solution is excellent for wetting the floors of offices, stores, workshops, halls and school rooms before sweeping.

Mixed with an equal quantity of water this solution is useful for washing the hands and general surfaces of the bodies of attendants.

☞Chloride of lime, carbolic acid and corrosive sublimate are deadly poisons.

STANDARD DISINFECTANT NO. 4.

Milk of Lime (Quick Lime).

Slack a quart of freshly burnt lime (in small pieces) with three-fourths of a quart of water—or, to be exact, 60 parts of water by weight with 100 lime. A dry powder of slack lime (hydrate of lime) results. Make milk or lime not long before it is to be used by mixing one part of this dry hydrate of lime with eight parts (by weight) of water.

Air-slacked lime is worthless. The dry hydrate may be preserved some time if it is enclosed in an air-tight container. Milk of lime should be freshly prepared, but may be kept a few days if it is closely stoppered.

Quick lime is one of the cheapest of disinfectants. The solution can take the place of chloride of lime, if desired. It should be used freely, in quantity equal in amount to the material to be disinfected. It can be used to whitewash exposed surfaces, to disinfect excreta in the sick-room or on the surface of the ground, in sinks, drains, stagnant pools, etc.

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